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Cicero.

CICERO (Marcus) Tullius, the celebrated Roman orator, was born in the year of Rome 647, about 107 years before Christ. His father Marcus Tullius, who was of the equestrian order, took great care of his education, which was directed particularly with a view to the bar. Young Tully, at his first appearance in public, declaimed with such vehemence against Sylla's party, that it became expedient for him to retire into Greece; where he heard the Athenian orators and philosophers, and greatly improved both in eloquence and knowledge. Here he met with T. Pomponius, who had been his school-fellow; and who, from his love to Athens, and spending a great part of his days in it, obtained the surname of *Atticus*; and there they revived and confirmed that noted friendship which subsisted between them through life with so celebrated a constancy and affection. From Athens he passed into Asia; and after an excursion of two years came back again into Italy.

Cicero was now arrived at Rome; and, after one year more spent at the bar, obtained, in the next place, the dignity of quaestor. Among the causes which he pleaded before his quaestorship, was that of the famous comedian Roscius, whom a singular merit in his art had recommended to the familiarity and friendship of the great men in Rome. The quaestors were the general receivers or treasurers of the republic, and were sent annually into the provinces distributed to them, as they always were, by lot. The island of Sicily happened to fall to Cicero's share; and that part of it, for it was considerable enough to be divided into two provinces, which was called *Lilybaeum*. This office he received, not as a gift, but a trust; and he acquitted himself so well in it, that he gained the love and admiration of all the Sicilians. Before he left Sicily, he made the tour of the island, to see every thing that was curious, and especially the city of Syracuse; where he discovered the tomb of Archimedes to the magistrates who were showing him the curiosities of the place, but who, to his surprise, knew nothing of any such tomb.

We have no account of the precise time of Cicero's marriage with Terentia; but it is supposed to have been celebrated immediately after his return from his travels to Italy, when he was about 30 years old. He was now disengaged from his quaestorship in Sicily, by which first step, in the legal gradation and ascent of public honours, he gained an immediate right to the senate, and an actual admission into it during life; and settled again in Rome, where he employed himself constantly in defending the persons and properties

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of its citizens, and was indeed a general patron. Five years were almost elapsed since Cicero's election to the quaestorship, which was the proper interval prescribed by law before he could hold the next office of aedile; to which he was now, in his 37th year, elected by the unanimous suffrages of all the tribes, and preferably to all his competitors. After Cicero's election to the aedileship, but before his entrance upon the office, he undertook the famed prosecution of C. Verres, the late praetor of Sicily; who was charged with many flagrant acts of injustice, rapine, and cruelty, during his triennial government of that island. This was one of the most memorable transactions of his life; for which he was greatly and justly celebrated by antiquity, and for which he will, in all ages, be admired and esteemed by the friends of mankind. The result was, that, by his diligence and address, he so confounded Hortensius, though the reigning orator at the bar and usually styled *the king of the forum*, that he had nothing to say for his client. Verres, despairing of all defence, submitted immediately, without expecting the sentence, to a voluntary exile; where he lived many years, forgotten and deserted by all his friends. He is said to have been relieved in this miserable situation by the generosity of Cicero; yet was proscribed and murdered after all by Mark Antony, for the sake of those fine statues and Corinthian vessels of which he had plundered the Sicilians.

After the usual interval of two years from the time of his being chosen aedile, Cicero offered himself a candidate for the praetorship; and in three different assemblies convened for the choice of praetors, two of which were dissolved without effect, he was declared every time the first praetor by the suffrages of all the centuries. He was now in the career of his fortunes; and in sight, as it were, of the consulship, the grand object of his ambition; and therefore, when his praetorship was at an end, he would not accept any foreign province, the usual reward of that magistracy, and the chief fruit which the generality proposed from it. He had no particular love for money, nor genius for arms; so that those governments had no charms for him: the glory which he pursued was to shine in the eyes of the city as the guardian of its laws; and to teach the magistrates how to execute, the citizens how to obey, them.

Being now in his 43d year, the proper age required by law, he declared himself a candidate for the consulship; along with six competitors, L. Sculpicius Galba, L. Sergius Catillina, C. Antonius, L. Cassius Longinus, Q. Cornificius, and C. Licinius Sacerdos. The

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two first were patricians; the two next plebeians, yet noble; the two last the sons of fathers who had first imported the public honours into their families: Cicero was the only *new man*, as he was called, among them, or one of equestrian rank. These were the competitors; and in this competition the practice of bribing was carried on as openly and as shamefully by Antonius and Catiline as it usually is at our elections in Britain. However, as the election approached, Cicero's interest appeared to be superior to that of all the candidates: for the nobles themselves, though always envious and desirous to depress him, yet out of regard to the dangers which threatened the city from many quarters, and seemed ready to burst out into a flame, began to think him the only man qualified to preserve the republic, and break the cabals of the desperate by the vigour and prudence of his administration. The method of choosing consuls was not by an open vote; but by a kind of ballot, or little tickets of wood distributed to the citizens, with the names of the several candidates inscribed upon each: but in Cicero's case the people were not content with this secret and silent way; but, before they came to any scrutiny, loudly and universally proclaimed Cicero the first consul: so that, as he himself says, "he was not chosen by the votes of particular citizens, but the common suffrage of the city; nor declared by the voice of the crier, but of the whole Roman people."

Cicero had no sooner entered upon his office than he had occasion to exert himself against P. Servilius Rullus, one of the new tribunes, who had been alarming the senate with the promulgation of an Agrarian law; the purpose of which was to create a decemvirate, or ten commissioners, with absolute power for five years over all the revenues of the republic, to distribute them at pleasure to the citizens, &c. These laws used to be greedily received by the populace, and were proposed therefore by factious magistrates as oft as they had any point to carry with the multitude against the public good; so that Cicero's first business was to quiet the apprehensions of the city, and to baffle, if possible, the intrigues of the tribune. Accordingly, in an artful and elegant speech from the rostra, he gave such a turn to the inclination of the people, that they rejected this law with as much eagerness as they had ever received one. But the grand affair of all, which constituted the glory of his consulship, and has transmitted his name with such lustre to posterity, was the skill he showed, and the unwearied pains he took, in suppressing that horrid conspiracy which was formed by Cataline and his accomplices for the subversion of the commonwealth. For this great service he was honoured with the glorious title of *pater patriæ*, "the father of his country," which he retained for a long time after.

Cicero's administration was now at an end; but he had no sooner quitted his office, than he began to feel the weight of that envy which is the certain fruit of illustrious merit. He was now, therefore, the common mark, not only of all the factious, against whom he had declared perpetual war, but of another party not less dangerous, the envious too: whose united spleen never left him from this moment till they had driven him out of that city which he had so lately preserved. Cicero, upon the expiration of his consul-

ship, took care to send a particular account of his whole administration to Pompey, who was finishing the Mithridatic war in Asia; in hopes to prevent any wrong impressions there from the calumnies of his enemies, and to draw from him some public declaration in praise of what he had been doing. But Pompey being informed by Metellus and Cæsar of the ill humour that was rising against Cicero in Rome, answered him with great coldness; and instead of paying him any compliment, took no notice at all of what had passed in the affair of Catiline: upon which Cicero expostulates with him in a letter which is still extant.

About this time Cicero bought a house of M. Crassus of the Palatine-hill, adjoining to that in which he had always lived with his father, and which he is now supposed to have given up to his brother Quintus. The house cost him near L. 30,000, and seems to have been one of the noblest in Rome. It was built about 30 years before by the famous tribune M. Livius Drusus: on which occasion we are told, that when the architect promised to build it for him in such a manner that none of his neighbours should overlook him; "But if you have any skill (replied Drusus), contrive it rather so that all the world may see what I am doing." The purchase of so expensive a house raised some censure on his vanity; and especially as it was made with borrowed money. This circumstance he himself does not dissemble; but says merrily upon it, that "he was now plunged so deeply in debt, as to be ready for a plot, only that the conspirators would not trust him."

The most remarkable event that happened in this year, which was the 45th of Cicero's life, was the pollution of the mysteries of the *bona dea* by P. Clodius; which, by an unhappy train of consequences, involved Cicero in a great and unexpected calamity. Clodius had an intrigue with Cæsar's wife Pompeia, who, according to annual custom, was now celebrating in her house those awful sacrifices of the goddesses, to which no male creature ever was admitted, and where every thing masculine was so scrupulously excluded, that even pictures of that sort were covered during the ceremony. It flattered Clodius's imagination greatly to gain access to his mistress in the midst of her holy ministry; and with this view he dressed himself in a woman's habit, that by the benefit of his smooth face, and the introduction of one of the maids, he might pass without discovery: but by some mistake between him and his guide, he lost his way when he came within the house, and fell in unluckily among the other female servants. Here he was detected by his voice, and the servants alarmed the whole company by their shrieks, to the great amazement of the matrons, who threw a veil over their sacred mysteries, while Clodius found means to escape. The story was presently spread abroad, and raised a general scandal and horror throughout the city. The whole defence which Clodius made when, by order of the senate, he was brought to a trial, was to prove himself absent at the time of the fact; for which purpose he produced two men to swear that he was then at Interamna, about two or three days journey from the city. But Cicero being called upon to give his testimony, deposed, that Clodius had been with him that very morning

Cicero. ing at his house in Rome. Irritated by this, Clodius formed a scheme of revenge. This was to get himself chosen tribune, and in that office to drive Cicero out of the city, by the publication of a law, which, by some stratagem or other, he hoped to obtrude upon the people. But as all patricians were incapable of the tribunate by its original institution, so his first step was to make himself a plebeian, by the pretence of an adoption into a plebeian house, which could not yet be done without the suffrage of the people. The first triumvirate was now formed; which was nothing else in reality but a traitorous conspiracy of three of the most powerful citizens of Rome, to extort from their country by violence what they could not obtain by law. Pompey's chief motive was to get his acts confirmed by Cæsar in his consulship, which was now coming on; Cæsar, by giving way to Pompey's glory, to advance his own; and Crassus, to gain that ascendance by the authority of Pompey and Cæsar, which he could not sustain alone. Cicero might have made what terms he pleased with the triumvirate; and been admitted even a partner of their power, and a fourth in their league: but he would not enter into any engagements with the three whose union he and all the friends of the republic abhorred. Clodius, in the mean time, had been pushing on the business of his adoption: which at last he effected; and began soon after to threaten Cicero with all the terrors of his tribunate, to which he was now advanced without any opposition. Both Cæsar and Pompey secretly favoured his scheme; not that they intended to ruin Cicero, but only to keep him under the lash; and if they could not draw him into their measures, or make him at least keep quiet, to let Clodius loose upon him. Cæsar, in particular, wanted to distress him so far as to force him to a dependence on himself: for which end, while he was privately encouraging Clodius to pursue him, he was proposing expedients to Cicero for his security. But though his fortunes seemed now to be in a tottering condition, and his enemies to gain ground daily upon him; yet he was unwilling to owe the obligation of his safety to any man, far less to Cæsar, whose designs he always suspected, and whose schemes he never approved. This stiffness in Cicero so exasperated Cæsar, that he resolved immediately to assist Clodius with all his power to oppress him; while Pompey was all the while giving him the strongest assurances that there was no danger, and that he would sooner be killed himself than suffer him to be hurt.

Clodius, in the mean time, was obliging the people with several new laws, contrived chiefly for their advantage; the design of all which was only to introduce, with a better grace, the ground-plot of the play, the banishment of Cicero. In short, having caused a law to be enacted, importing, that any who had condemned a Roman citizen unheard, should himself be banished, he soon after impeached Cicero upon it. It was in vain that this great man went up and down the city soliciting his cause in the habit of a suppliant, and attended by many of the first young noblemen whom he had taught the rules of eloquence; those powers of speaking which had so often been successful in defending the cause of others, seemed totally to forsake his own: he was banished by the votes of the people 400 miles from Italy; his houses were ordered

to be demolished, and his goods set up to sale. It cannot be denied, that in this great calamity he did not behave himself with that firmness which might reasonably be expected from one who had borne so glorious a part in the republic; conscious of his integrity, and suffering in the cause of his country: for his letters are generally filled with such lamentable expressions of grief and despair, that his best friends, and even his wife, were forced sometimes to admonish him to rouse his courage, and remember his former character. Atticus was constantly putting him in mind of it; and sent him word of a report that was brought to Rome by one of Cassius's freed-men, that his affliction had disordered his senses. He was now indeed attacked in his weakest part: the only place in which he was vulnerable. To have been as great in affliction as he was in prosperity, would have been a perfection not given to man: yet this very weakness flowed from a source which rendered him the more amiable in all the other parts of his life; and the same tenderness of disposition which made him love his friends, his children, and his country, more passionately than other men, made him feel the loss of them more sensibly. When he had been gone a little more than two months, a motion was made in the senate by one of the tribunes, who was his friend, to recal him, and repeal the laws of Clodius; to which the whole house readily agreed. Many obstructions, as may be easily imagined, were given to it by the Clodian faction; but this made the senate only more resolute to effect it. They passed a vote, therefore, that no other business should be done till Cicero's return was carried: which at last it was; and in so splendid and triumphant a manner, that he had reason, he says, to fear, lest people should imagine that he himself had contrived his late flight for the sake of so glorious a restoration.

Cicero, now in his 50th year, was restored to his former dignity, and soon after to his former fortunes; satisfaction being made to him for the ruin of his estates and houses; which last were built up again by himself with more magnificence than before. But he had domestic grievances about this time, which touched him very nearly; and which, as he signifies obscurely to Atticus, were of too delicate a nature to be expressed in a letter: They arose chiefly from the petulant humour of his wife, which began to give him frequent occasions of chagrin; and, by a series of repeated provocations, confirmed in him that settled disgust which at last ended in a divorce.

In the 56th year of his age, he was made proconsul of Cilicia; and his administration there gained him great honour. About this time the expectation of a breach between Cæsar and Pompey engaged the general attention. Crassus had been destroyed with his army some years before in the war with the Parthians; and Julia the daughter of Cæsar, whom Pompey married, and who, while she lived, was the cement of their union, was also dead in child-bed. Cæsar had put an end to the Gallic war, and reduced the whole province to the Roman yoke: but though his commission was near expiring, he seemed to have no thoughts of giving it up and returning to the condition of a private subject. He pretended that he could not possibly be safe if he parted with his army; especially while Pompey held the province of Spain

Cicero. prolonged to him for five years. This disposition to a breach Cicero soon learned from his friends, as he was returning from his province of Cilicia. But as he foresaw the consequences of a war more clearly and fully than any of them, so his first resolution was to apply all his endeavours and authority to the mediation of a peace; though, in the event of a breach, he was determined within himself to follow Pompey. He clearly foresaw, what he declared without scruple to his friends, that which side soever got the better, the war must necessarily end in a tyranny. The only difference, he said, was, that if their enemies conquered, they would be proscribed; if their friends, they would be slaves.

He no sooner arrived at the city, however, than he fell, as he tells us, into the very flame of civil discord, and found the war in effect proclaimed: for the senate had just voted a decree, that Cæsar should disband his army by a certain day, or be declared an enemy; and Cæsar's sudden march towards Rome effectually confirmed it. In the midst of all this hurry and confusion, Cæsar was extremely solicitous about Cicero; not so much to gain him, for that was not to be expected, as to prevail with him to stand neuter. He wrote to him several times to that effect; and employed all their common friends to press him with letters on that subject: all which was done; but in vain, for Cicero was impatient to be gone to Pompey. In the mean time, these letters give us a most sensible proof of the high esteem and credit in which Cicero flourished at this time in Rome; when, in a contest for empire, which force alone was to decide, we see the chiefs on both sides so solicitous to gain a man to their party, who had no peculiar skill in arms or talents for war. Pursuing, however, the result of all his deliberations, he embarked at length to follow Pompey who had been obliged to quit Italy some time before, and was then at Dyrrhachium; and arrived safely in his camp with his son, his brother, and his nephew, committing the fortunes of the whole family to the issue of that cause. After the battle of Pharsalia, in which Pompey was defeated, Cicero returned into Italy, and was afterwards received into great favour by Cæsar, who was now declared dictator the second time, and Mark Antony his master of horse. We may easily imagine, what we find indeed from his letters, that he was not a little discomposed at the thoughts of an interview with Cæsar, and the indignity of offering himself to a conqueror against whom he had been in arms: for though upon many accounts he had reason to expect a kind reception from Cæsar, yet he hardly thought his life, he says, worth begging; since what was given by a master might always be taken away again at pleasure. But at their meeting he had no occasion to say or do any thing that was below his dignity: for Cæsar no sooner saw him than he alighted, ran to embrace him, and walked with him alone, conversing very familiarly for several furlongs.

Cicero was now in his 61st year, and forced at last to part with his wife Terentia; whose humour and conduct had been long uneasy to him. She was a woman of an imperious and turbulent spirit: and though he had borne her perverseness in the vigour of health, and flourishing state of his fortunes; yet, in a declining life, soured by a continual succession of mor-

tifications from abroad, the want of ease and quiet at home was no longer tolerable to him. But he was immediately oppressed by a new and most cruel affliction, the death of his beloved daughter Tullia, who died in child-bed soon after her divorce from her third husband Dolabella. She was about 32 years old at the time of her death; and, by the few hints which are left of her character, appears to have been an excellent and admirable woman. She was most affectionately and piously observant of her father; and, to the usual graces of her sex, having added the more solid accomplishments of knowledge and polite letters, was qualified to be the companion and delight of his age; and was justly esteemed not only as one of the best, but the most learned, of the Roman ladies. His affliction for the death of this daughter was so great, that, to shun all company as much as he could, he removed to Atticus's house, where he lived chiefly in his library, turning over every book he could meet with on the subject of moderating grief. But finding his residence here too public, and a greater resort to him than he could bear, he retired to Asturia, one of his seats near Antium; a little island on the Latian shore, at the mouth of a river of the same name, covered with woods and groves cut into shady walks; a scene of all others the fittest to indulge melancholy, and where he could give a free course to his grief. "Here (says he to Atticus) I live without the speech of man; every morning early I hide myself in the thickest of the wood, and never come out till the evening. Next to yourself, nothing is so dear to me as this solitude; and my whole conversation is with my books." Indeed his whole time was employed in little else than reading and writing during Cæsar's administration, which he could never cheerfully submit to; and it was within this period that he drew up one of the gravest of those philosophical pieces which are still extant in his works.

Upon the death of Cæsar, Octavius his nephew and heir coming into Italy, was presented to Cicero by Hirtius and Pansa, with the strongest professions on the part of the young man that he would be governed entirely by his direction. Indeed Cicero thought it necessary to cherish and encourage Octavius, if for nothing else, yet to keep him at a distance from Antony; but could not yet be persuaded to enter heartily into his affairs. He suspected his youth and want of experience; and that he had not strength enough to deal with Antony; and, above all, that he had no good disposition towards the conspirators. He thought it impossible he should ever be a friend to them; and was persuaded rather, that if ever he got the upper hand, his uncle's acts would be more violently enforced, and his death more cruelly revenged, than by Antony himself. And when Cicero did consent at last to unite himself to Octavius's interests, it was with no other view but to arm him with a power sufficient to oppress Antony; yet so checked and limited, that he should not be able to oppress the republic.

In the hurry of all these politics, he was still prosecuting his studies with his usual application; and, besides some philosophical pieces, now finished his book of offices, or the duties of man, for the use of his son: A work admired by all succeeding ages as the most perfect system of Heathen morality, and the noblest effort

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Cicero. and specimen of what reason could do in guiding man through life with innocence and happiness. However, he paid a constant attention to public affairs; missed no opportunities, but did every thing that human prudence could do for the recovery of the republic: for all that vigour with which it was making this last effort for itself, was entirely owing to his counsels and authority. This appears from those memorable Philippics which from time to time he published against Antony, as well as from other monuments of antiquity. But all was in vain: for though Antony's army was entirely defeated at the siege of Modena, which made many people imagine that the war was at an end, and the liberty of Rome established; yet the death of the consuls Pansa and Hirtius in that action gave the fatal blow to all Cicero's schemes, and was the immediate cause of the ruin of the republic.

Octavius having subdued the senate to his mind, marched towards Gaul to meet Antony and Lepidus; who had already passed the Alps, and brought their armies into Italy, in order to have a personal interview with him; which had been privately concerted for settling the terms of a triple league, and dividing the power and provinces of Italy among themselves. The place appointed for this interview was a small island about two miles from Bononia, formed by the river Rhenus, which runs near that city. Here they met, and spent three days in a close conference to adjust the plan of their accommodation: and the last thing they adjusted was the list of a proscription which they were determined to make of their enemies. This, as the writers tell us, occasioned much difficulty and warm contests among them; till each in his turn consented to sacrifice some of his best friends to the revenge and resentment of his colleagues. Cicero was at his Tusculan villa, when he first received the news of the proscription, and of his being included in it. It was the design of the triumvirate to keep it a secret, if possible, to the moment of execution; in order to surprise those whom they had destined to destruction, before they were aware of their danger, or had time to make their escape. But some of Cicero's friends found means to give him early notice of it; upon which he set forward to the sea-side, with a design to transport himself out of the reach of his enemies. There, finding a vessel ready, he presently embarked; but the winds being adverse, and the sea uneasy to him, after he had sailed about two leagues along the coast, he was obliged to land, and spend the night on shore. From thence he was forced, by the importunity of his servants, on board again; but was soon afterwards obliged to land at a country seat of his a mile from the shore, weary of life, and declaring he was resolved to die in that country which he had so often saved. Here he slept soundly for some time, till his servants once more forced him away in a litter towards the ship, having heard that he was pursued by Antony's assassins. They were scarce departed when the assassins arrived at his house; and, perceiving him to be fled, pursued him immediately towards the sea, and overtook him in a wood that was near the shore. Their leader was one Popilius Lenas, a tribune of the army, whose life Cicero had formerly defended and saved. As soon as the soldiers appeared, the servants prepared to defend their master's life at the hazard of

their own; but Cicero commanded them to set him down and make no resistance. They soon cut off his head and his hands, returning with them to Rome as the most agreeable present to their cruel employer. Antony, who was then at Rome, received them with extreme joy, rewarding the murderer with a large sum of money, and ordering the head to be fixed upon the rostra between the two hands: a sad spectacle to the city; and what drew tears from every eye, to see those mangled members which used to exert themselves so gloriously from that place in defence of the lives, the fortunes, and the liberties of the Roman people, so lamentably exposed to the scorn of sycophants and traitors. The deaths of the rest, says an historian of that age, caused only a private and particular sorrow; but Cicero's an universal one. It was a triumph over the republic itself; and seemed to confirm and establish the perpetual slavery of Rome.

A modern writer*, however, is of opinion, that *Swinburne, "posterity has been too much seduced by the name of *Travels in Sicily*, vol. ii. p. 502. Cicero, and that better citizens were sacrificed to the jealousy of the triumvirs without exciting so much indignation. If we take an impartial survey of Cicero's conduct and principles, avowed in his own epistolary correspondence, and trace him through all the labyrinths of his contradictory letters, we shall find more to blame than to admire; and discover, that the desire of advancing his fortunes, and making himself a name, were, from his outset in life, the only objects he had in view. The good of his country, and the dictates of stern steady virtue, were not, as in Brutus and Cato, the constant springs of his actions. The misfortunes that befel him after his consulship, developed his character, and showed him in his true colours: from that time to his death, pusillanimity, irresolution, and unworthy repining, tainted his judgment, and perplexed every step he wished to take. He flattered Pompey and cringed to Cæsar, while in his private letters he abused them both alternately. He acknowledges in a letter to his friend, the time-serving Atticus, that, although he was at present determined to support the cause of Rome and liberty, and to bear misfortune like a philosopher, there was one thing which would gain him over to the triumvirs, and that was their procuring for him the vacant augurship; so pitiful was the bribe to which he would have sacrificed his honour, his opinion, and the commonwealth. By his wavering imprudent conduct, he contributed greatly towards its destruction. After reproaching the conspirators for leaving him out of the secret, and loading them with the most flattering compliments on their delivering Rome from Cæsar's tyranny, he calls Casca an *assassin*, to pay his court to the boy Octavius, by whom he was completely duped. His praises of this triumvir are in the highest strain of panegyric. Mark Antony well knew, that the virulent abuse which Cicero was continually pouring out against him, was not an effusion of patriotic zeal or virtuous indignation, but merely the ebullitions of personal hatred. He therefore caused Cicero to be killed, as an angry man that has been stung stamps on a venomous animal that comes within reach of his foot. The cloak he threw over the body of Brutus, and the speech he pronounced at the sight of that hero when dead, differ widely from the treatment he gave the remains of Cicero; and show, that he made

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made a distinction between a Roman who opposed him from political motives, and one whose enmity arose from private pique."

Cicero's death happened on the 7th of December, in the 64th year of his age, about ten days from the settlement of the first triumvirate; and with him expired the short empire of eloquence among the Romans. As an orator he is thus characterised by Dr Blair. "In all his orations his art is conspicuous. He begins commonly with a regular exordium; and with much address prepossesses the hearers, and studies to gain their affections. His method is clear, and his arguments are arranged with exact propriety. In a superior clearness of method, he has an advantage over Demosthenes. Every thing appears in its proper place. He never tries to move till he has attempted to convince; and in moving, particularly the softer passions, he is highly successful. No one ever knew the force of words better than Cicero. He rolls them along with the greatest beauty and magnificence; and in the structure of his sentences is eminently curious and exact. He is always full and flowing, never abrupt. He amplifies every thing; yet though his manner is generally diffuse, it is often happily varied and accommodated to the subject. When an important public object roused his mind, and demanded indignation and force, he departs considerably from that loose and declamatory manner to which he at other times is addicted, and becomes very forcible and vehement. This great orator, however, is not without his defects. In most of his orations there is too much art, even carried to a degree of ostentation. He seems often desirous of obtaining admiration rather than of operating conviction. He is sometimes, therefore, showy rather than solid, and diffuse where he ought to have been urgent. His sentences are always round and sonorous. They cannot be accused of monotony, since they possess variety of cadence; but from too great a fondness for magnificence, he is on some occasions deficient in strength. Though the services which he had performed to his country were very considerable, yet he is too much his own panegyrist. Ancient manners, which imposed fewer restraints on the side of decorum, may in some degree excuse, but cannot entirely justify, his vanity."

CICHORIUM, SUCCORY: A genus of the polygamia æqualis order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The receptacle is a little paleaceous; the calyx calyculated; the pappus almost quinque-dentated, and indistinctly hairy.

Species. 1. The intybus, or wild succory, grows naturally by the sides of roads, and in shady lanes, in many places of Britain. It sends out long leaves from the roots, from between which the stalks arise, growing to the height of three or four feet, and branching out into smaller ones. The flowers come out from the sides of the stalks, and are of a fine blue colour. They are succeeded by oblong seeds covered, inclosed in a down. 2. The spinosum, with a prickly forked stalk, grows naturally on the sea-coasts in Sicily, and the islands of the Archipelago. This sends out from the root many long leaves which are indented on their edges, and spread flat on the ground; from between these arise the stalks, which have very few leaves,

and these are small and entire: these stalks are divided in forks upward, and from between them come out the flowers, which are of a pale blue colour, and are succeeded by seeds shaped like those of the common sorts. The ends of the smaller branches are terminated by star-like spines which are very sharp. 3. The endivia, or succory with broad crenated leaves, differs from the wild sort in its duration, being only annual, whereas the wild sort is perennial.

Culture, &c. The last species may be considered both as an annual and biennial plant. If sown early in the spring, or even any time before the beginning of June, the plants very commonly fly up to seed the same summer, and perish in autumn. If sown in June and July, they acquire perfection in autumn, continue till the next spring, then shoot up stalks for flower and seed, and soon after perish. The inner leaves are the useful parts. These when blanched white to render them crisp and tender, and reduce them from their natural strong taste to an agreeably bitter one, are then fit for use. They are valued chiefly as ingredients in autumn and winter salads, and for some culinary uses. The principal season of them is from the latter end of August till Christmas or longer, according to the temperature of the season; though the curled kinds generally resist the frosts of our ordinary winters, and remain in tolerable perfection till March or April. They are propagated by seeds sown in an open spot of ground, from which the plants are to be removed into open beds or borders, where they may remain to grow to full size. The season for sowing these seeds is from the beginning of June to the end of July; and to have a regular supply of plants, it is proper to perform three different sowings at about three weeks or a month's interval. The great excellence of endive is to have its inner leaves finely whitened or blanched. They naturally incline to whiteness of themselves; but this may be greatly improved by art when the plants are arrived at full growth. Different methods are practised for this purpose, such as tying the leaves together; or taking up the plants, and replanting them directly, almost to their tops, in ridges of dry earth, laying boards or tiles flat-ways on the top of the plants; but the first is found to answer the purpose most effectually. The proper time for beginning this work is, when the leaves are almost full grown: that is, when they are so far advanced that the leaves of the different plants interfere with one another, and their hearts are full and bushy: but they are not all to be tied up at once, only a due supply of the largest and forwardest plants, once every ten or twelve days according to the demand; for the blanching takes up about three weeks. Blanching in ridges of earth, however, is sometimes practised in winter when a severe frost is setting in; for by burying them in the earth almost to their tops, they are more out of the power of the cold. In November, or December, when hard weather is approaching, let a piece of light ground, that lies warm, be trenched up in one or more sharp ridges two or three feet wide at bottom, and near as much in height, sideways to the sun, making the sides as steep as possible, that the wet may run quickly off; then, in a dry day, take up a quantity of your fully grown plants,

Cichori-
um.

Cicindela. plants, with their roots entire, and divesting them of damaged leaves, gather each plant close in your hand, placing them horizontally in the sunny side of the ridge of earth almost to their tops, and about six or eight inches each way distant. In severe frost, it will be proper to bestow some covering on the plants.

Medicinal uses. The roots and leaves of the wild succory, and seeds of the endive, are articles of the *materia medica*. The first has a moderately bitter taste, with some degree of roughness; the leaves are somewhat less bitter; and the darker coloured and more deeply jagged they are, the bitterer is their taste. Wild succory is an useful detergent, aperient, and attenuating medicine, acting without much irritation, tending rather to cool than to heat the body; and, at the same time, corroborating the tone of the intestines. All the parts of the plant, when wounded, yield a milky saponaceous juice. This, when taken in large quantities, so as to keep up a gentle diarrhoea, and continued for some weeks, has been found to produce excellent effects in scorbutic and other chronical disorders. The qualities of the endive are nearly of the same kind. The seeds are ranked among the four lesser cold ones.

CICINDELA, the SPARKLER, in zoology, a genus of insects belonging to the order of coleoptera. The antennæ are setaceous; the jaws are prominent, and furnished with teeth; the eyes are a little prominent; and the breast is roundish and marginated. There are 14 species. The *campestris*, or field-sparkler, is one of the most beautiful of the genus. The upper part of its body is of a fine green colour, rough, and rather bluish. The under side, as also the legs and antennæ, are of a shot colour, gold and red, of a copperish cast. The eyes are very prominent, and give the head a broad appearance. The thorax is angular, and narrower than the head; which constitutes the character of the *cicindela*. It is rough, and of a green colour tinged with gold, as well as the head. The elytra are delicately and irregularly dotted. Each of them has six white spots, viz. one on the top of the elytrum, at its outward angle: three more along the outward edge, of which the middlemost forms a kind of lunula: a fifth, on the middle of the elytra, opposite the lunula; and that one is broader, and tolerably round: lastly, a sixth, at the extremity of the elytra. There is also sometimes seen a black spot on the middle of each elytrum, opposite to the second white spot. The upper lip is also white, as is the upper side of the jaws, which are very prominent and sharp. This insect runs with great swiftness, and flies easily. It is found in dry sandy places, especially in the beginning of spring. In the same places its larva is met with, which resembles a long, soft, whitish worm, armed with six legs, and a brown scaly head. It makes a perpendicular round hole in the ground, and keeps its head at the entrance of the hole to catch the insects that fall into it; a spot of ground is sometimes entirely perforated in this manner. The insects belonging to this genus are in general very beautiful, and merit the attention of the curious in their microscopic observations; some are minute, though not inferior in splendor, therefore best suited for the amusement. Living subjects are ever preferable to dead ones. The larvæ of all this genus

live under ground; and are, as well as the perfect insects, tigers in their nature, attacking and destroying all they can overcome.

CICISBEO, an Italian term, which in its etymology signifies a *whisperer*; which has been bestowed in Italy both on lovers, and on those who to outward appearance act as such, attending on married ladies with as much attention and respect as if they were their lovers. This Italian custom has been spoken of very reproachfully by some writers; Mr Baretta has taken great pains to vindicate it. He ascribes it to a spirit of gallantry, derived from the ages of chivalry, and much heightened and refined by the revival of the Platonic philosophy in Italy, about the thirteenth century; and by the verses of Petrarch in compliment to the beautiful Laura, and his numerous imitators.

CICLUT, or *CICLUGH*, a strong frontier town of Dalmatia, situated on the river Narenta, in E. Long. 17. 40. N. Lat. 45. 20. It is surrounded with walls built in the ancient manner, and was taken by the Venetians from the Turks in 1694.

CICONES, a people of Thrace near the Hebrus. Ulysses at his return from Troy conquered them, and plundered their chief city Ismarus. They tore to pieces Orpheus for his obscene indulgencies.

CICUTA, properly signifies an hollow intercepted between two knots, of the stalks or reeds of which the ancient shepherds used to make their pipes. It is now, however, generally used to signify the water hemlock, and also the common sort; but Linnæus has described the latter under the old name of *CONIUM*. See that article.

There are three species of water-hemlock; the *virosa*, the *bulbifera*, and the *maculata*. Of these the first is the only one remarkable, and that for the poisonous qualities of its roots which have been often known to destroy children who eat them for parsnips.

CICUTA is also used, chiefly among the ancients, for the juice or liquor expressed from the above plant, being the common poison wherewith the state criminals at Athens were put to death: Though some have suggested, that the poisonous draught to which the Athenians doomed their criminals was an inspissated juice compounded of the juice of *cicuta* and some other corrosive herbs.

Socrates drank the *cicuta*.—Plato, in his dialogue on the immortality of the soul, observes, that "The executioner advised Socrates not to talk, for fear of causing the *cicuta* to operate too slowly." M. Petit, in his *Observationes Miscellaneæ*, remarks, that this advertisement was not given by the executioner out of humanity, but to save the *cicuta*: for he was only allowed so much poison *per ann.* which, if he exceeded, he was to furnish at his own expence. This construction is confirmed by a passage in Plutarch: the executioner who administered the *cicuta* to Phocion, not having enough, Phocion gave him money to buy more; observing by the way, "that it was odd enough, that at Athens a man must pay for every thing, even his own death."

CID (Roderigo Dias le), a Castilian officer, who was very successful against the Moors, under Ferdinand II. king of Castile; but whose name would hardly have been remembered, if Corneille had not made

Cicisbeo
||
Cid.

Plate
CXXXVIII.

Barbut's
Insects.

his

Cidaris
||
Cilicia.

his passion for Chimene the subject of an admired tragedy, founded on a simple but affecting incident. The Cid is desperately in love with Chimene, daughter of the Count de Gomes: but he is at variance with the Count; and being challenged by him, kills him in a duel. The conflict between love and honour in the breast of Chimene, who at length pardons and marries the Cid, forms the beauty of the piece. He died in 1698.

CIDARIS, in antiquity, the mitre used by the Jewish high-priests. The Rabbins say, that the bonnet used by priests in general was made of a piece of linen cloth 16 yards long, which covered their heads like a helmet or turban: and they allow no other difference between the high-priest's bonnet and that of other priests, than that the one is flatter, and more in the form of a turban; whereas that worn by ordinary priests rose something more in a point.

CIGNANI (Carlo), an Italian painter, was born at Bologna in 1628; and was the disciple of Albani. He was esteemed by pope Clement XI. who nominated him prince of the academy of Bologna, and loaded him with favours. Cignani died at Forli in 1719. The cupola of la Madona del Fuoco at Forli, in which he represented Paradise, is an admirable work. His principal pictures are at Rome, Bologna, and Forli.

CIGOLI, or CIVOLI, the painter. See CIVOLI.

CILIA, the EYE-LASHES. See ANATOMY, p. 766, col. 1.

CILIATED LEAF, among botanical writers, one surrounded with parallel filaments somewhat like the hairs of the eye-lids.

CILICIA, an ancient kingdom of Asia, lying between the 36th and 40th degree of north latitude: bounded on the east by Syria, or rather by Mount Amanus, which separates it from that kingdom; by Pamphylia, on the west; by Isauria, Cappadocia, and Armenia Minor, on the north; and by the Mediterranean sea, on the south. It is so surrounded by steep and craggy mountains, chiefly the Taurus and Amanus, that it may be defended by a handful of resolute men against a numerous army, there being but three narrow passes leading into it, commonly called *Pyle Cilicia*, or the gates of Cilicia; one on the side of Cappadocia, called the *Pass of Mount Taurus*; and the other two called the *Pass of Mount Amanus*, and the *Pass of Syria*. The whole country was divided by the ancients into Cilicia Aspera, and Cilicia Campestris; the former called by the Greeks *Trachea* or *Stony*, from its abounding so with stones; and to this day the whole province is called by the Turks, *Tas Wilcieth*, or the *Stony Province*.

According to Josephus Cilicia was first peopled by Tarshish the son of Javan, and his descendants, whence the whole country was named *Tarsus*. The ancient inhabitants were in process of time driven out by a colony of Phoenicians, who, under the conduct of *Cilix*, first settled in the island of Cyprus, and from thence passed into the country which, from the leader, they called *Cilicia*. Afterwards, several other colonies from different nations settled in this kingdom, particularly from Syria and Greece; whence the Cilicians in some places used the Greek tongue, in others the Syriac; but the former greatly corrupted by the Persian, the predominant language of the country be-

ing a dialect of that tongue. We find no mention of the kings of Cilicia after their settlement in that country, till the time of Cyrus, to whom they voluntarily submitted, continuing subject to the Persians till the overthrow of that empire; but governed to the time of Artaxerxes Mnemon, by kings of their own nation. After the downfall of the Persian empire, Cilicia became a province of that of Macedon; and, on the death of Alexander, fell to the share of Seleucus, and continued under his descendants till it was reduced to a Roman province by Pompey. As a proconsular province, it was first governed by Appius Claudius Pulcher: and after him by Cicero, who reduced several strong holds on Mount Amanus, in which some Cilicians had fortified themselves, and held out against his predecessor. It was on this occasion that the division, formerly mentioned, into *Trachæa*, and *Campestris*, took place. The latter became a Roman province; but the former was governed by kings appointed by the Romans, till the reign of Vespasian, when the family of Tracondementus being extinct, this part also made a province of the empire, and the whole divided into *Cilicia Prima*, *Cilicia Secunda*, and *Isauria*; the first took in all Cilicia Campestris, the second the coast of Cilicia Trachæa, and the last the inland parts of the same division. It is now a province of Asiatic Turkey; and is called *Caramania*, having been the last province of the Caramanian kingdom which held out against the Ottoman race.

That part of Cilicia called by the ancients *Cilicia Campestris*, was, if we believe Ammianus Marcellinus, one of the most fruitful countries of Asia; but the western part equally barren, though famous, even to this day, for an excellent breed of horses, of which 600 are yearly sent to Constantinople for the special use of the Grand Signior. The air in the inland parts is reckoned wholesome; but that on the sea-coast very dangerous, especially to strangers.

The rivers of any note are the *Pramus*, which rises on the north side of mount Taurus, and empties itself into the Mediterranean between Issus and Magarassus; and the *Cydnus*, which springs from the Antitaurus, passes through Tarsus, and disembogues itself into the Mediterranean. This last is famous for the rapidity of its stream, and the coldness of its waters, which proved very dangerous to Alexander the Great.

The Cilicians, if we believe the Greek and Roman historians, were a rough unpolished race of people, unfair in their dealings, cruel, and liars even to a proverb. In the Roman times, they became greatly addicted to piracy. They first began, in the time of the Mithridatic war, to infest the neighbouring provinces along with the Pamphyliaus; and, being emboldened with success, they soon ventured as far as the coasts of Greece and Italy, where they took a vast number of slaves, whom they sold to the Cypriots and the kings of Egypt and Syria. They were, however, at last defeated and entirely suppressed by Pompey the Great. See (*History of*) ROME.

CILICIA Terra, in the natural history of the ancients, a bituminous substance improperly called an earth, which, by boiling, became tough like bird-lime, and was used instead of that substance to cover the stocks of the vines for preserving them from the worms. It probably served in this office in a sort of double capacity,

Cilicium
||
Cimbri.

capacity, driving away these animals by its nauseous smell, and entangling them if they chanced to get amongst it.

CILICIUM, in Hebrew antiquity, a sort of habit made of coarse stuff, formerly in use among the Jews in times of mourning and distress. It is the same with what the Septuagint and Hebrew versions call sackcloth.

CILLEY, an ancient and famous town of Germany, in the circle of Austria, and in Upper Carniola. It is the capital of a county of the same name, and is situated on the river Saan, in E. Long. 15. 45. N. Lat. 46. 28.

CILURNUM, (Notitia;) a town of Britain; thought to be Collerton, or Collerford, in Northumberland; but Walwick, or Scilicester, according to Camden.

CIMA, or **SIMA**, in architecture, the same with Cymatium, or OGEE.

CIMABUE (Giovani), a renowned painter, born at Florence in 1240, and the first who revived the art of painting in Italy. He painted, according to the custom of those times, in fresco and in distemper; colours in oil not being then found out. He excelled in architecture as well as in painting; and was concerned in the fabric of Sancta Maria del Fior at Florence: during which employment he died at the age of 60, and left many disciples.

CIMBRI, an ancient Celtic nation, inhabiting the northern parts of Germany. They are said to have been descended from the Asiatic *Cimmerians*, and to have taken the name of *Cimbri* when they changed their old habitations. When they first became remarkable, they inhabited chiefly the peninsula now called *Futland*, and by the ancients *Cimbrica Chersonesus*. About 113 years before Christ, they left their peninsula with their wives and children; and joining the Tuetones, a neighbouring nation, took their journey southward in quest of a better country. They first fell upon the Boii, a Gaulish nation situated near the Hercynian forest. Here they were repulsed, and obliged to move nearer the Roman provinces. The republic being then alarmed at the approach of such multitudes of barbarians, sent an army against them under the consul Papirius Carbo. On the approach of the Roman army, the Cimbri made proposals of peace. The consul pretended to accept it; but having thrown them into a disadvantageous situation, treacherously attacked their camp. His perfidy was rewarded as it deserved; the Cimbri ran to arms, and not only repulsed the Romans, but attacking them in their turn, utterly defeated them, and obliged the shattered remains of their forces to conceal themselves in the neighbouring forests. After this victory the Cimbri entered Transalpine Gaul, which they quickly filled with slaughter and desolation. Here they continued five or six years, when another Roman army under the consul Silanus marched against them. This general met with no better success than Carbo had done. His army was routed at the first onset; in consequence of which, all Narbonne Gaul was exposed at once to the ravages of these barbarians.

About 105 years before Christ, the Cimbri began to threaten the Roman empire itself with destruction. The Gauls marched from all parts with a design to

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join them, and to invade Italy. The Roman army was commanded by the proconsul Cæpio, and the consul Mallius; but as these two commanders could not agree, they were advised to separate, and divide their forces. This advice proved the ruin of the whole army. The Cimbri immediately fell upon a strong detachment of the consular army commanded by M. Aurelius Scaurus, which they cut off to a man, and made Scaurus himself prisoner. Mallius being greatly intimidated by this defeat, desired a reconciliation with Cæpio, but was haughtily refused. He moved nearer the consul, however, with his army, that the enemy might not be defeated without his having a share in the action. The Cimbri, by this movement, imagining the commanders had made up their quarrel, sent ambassadors to Mallius with proposals of peace. As they could not help going through Cæpio's camp, he ordered them to be brought before him; but finding they were empowered to treat only with Mallius, he could be scarce restrained from putting them to death. His troops, however, forced him to confer with Mallius about the proposals sent by the barbarians: but as Cæpio went to the consul's tent against his will, so he opposed him in every thing; contradicted with great obstinacy, and insulted him in the grossest manner. The deputies on their return acquainted their countrymen that the misunderstanding between the Roman commanders still subsisted; upon which the Cimbri attacked the camp of Cæpio, and the Gauls that of Mallius. Both were forced, and the Romans slaughtered without mercy. Eighty thousand citizens and allies of Rome, with 40,000 servants and sutlers, perished on that fatal day. In short, of the two Roman armies only 10 men, with the two generals, escaped to carry the news of so dreadful a defeat. The conquerors destroyed all the spoil, pursuant to a vow they had made before the battle. The gold and silver they threw into the Rhone, drowned the horses they had taken, and put to death all the prisoners.

The Romans were thrown into the utmost consternation on the news of so terrible an overthrow. They saw themselves threatened with a deluge of Cimbri and Gauls, numerous enough to over-run the whole country. They did not, however, despair. A new army was raised with incredible expedition; no citizen whatever who was fit to bear arms being exempted. On this occasion also, fencing-masters were first introduced into the Roman camp; by which means the soldiers were soon rendered in a manner invincible. Marius, who was at that time in high reputation on account of his victories in Africa, was chosen commander, and waited for the Cimbri in Transalpine Gaul; but they had resolved to enter Italy by two different ways; the Cimbri over the eastern, and the Teutones and other allies over the western, Alps. The Roman general therefore marched to oppose the latter, and defeated the Ambrones and Teutones with great slaughter†. The Cimbri, in the mean time, entered Italy, and struck the whole country with terror. Catullus and Sylla attempted to oppose them; but their soldiers were so intimidated by the fierce countenances and terrible appearance of these barbarians, that nothing could prevent their flying before them. The city of Rome was now totally defence-

† See Ambrones and Teutones

B

less;

Cimbri,
Cimex.

less; and, had the Cimbri only marched briskly forwards, they had undoubtedly become masters of it; but they waited in expectation of being joined by their allies the Ambrones and Teutones, not having heard of their defeat by Marius till the senate had time to recal him to the defence of his country. By their order he joined his army to that of Catullus and Sylla; and upon that union was declared commander in chief. The Roman army consisted of 52,300 men. The cavalry of the Cimbri were no more than 15,000, but their foot seemed innumerable; for, being drawn up in a square, they are said to have covered 30 furlongs. The Cimbri attacked the Romans with the utmost fury; but, being unaccustomed to bear the heats of Italy, they soon began to lose their strength, and were easily overcome. But they had put it out of their power to fly; for, that they might keep their ranks the better, they had, like true barbarians, tied themselves together with cords fastened to their belts, so that the Romans made a most terrible havock of them. The battle was therefore soon over, and the whole day employed only in the most terrible butchery. An hundred and twenty thousand were killed on the field of battle, and 60,000 taken prisoners. The victorious Romans then marched to the enemy's camp; where they had a new battle to fight with the women, whom they found more fierce than even their husband's had been. From their carts and waggons, which formed a kind of fortification, they discharged showers of darts and arrows on friends and foes without distinction. Then they first suffocated their children in their arms, and then they put an end to their own lives. The greatest part of them hanged themselves on trees. One was found hanging at a cart with two of her children at her heels. Many of the men, for want of trees and stakes, tied strings in running knots about their necks, and fastened them to the tails of their horses, and the horns and feet of their oxen, in order to strangle themselves that way; and thus the whole multitude was destroyed.

The country of the Cimbri, which, after this terrible catastrophe, was left a mere desert, was again peopled by the Scythians; who, being driven by Pompey out of that vast space between the Euxine and the Caspian sea, marched towards the north and west of Europe, subduing all the nations they met with in their way. They conquered Russia, Saxony, and Westphalia, and other countries as far as Finland, Norway, and Sweden. It is pretended that Wodin their leader traversed so many countries, and endeavoured to subdue them, only with a view to excite the people against the Romans; and that the spirit of animosity which he had excited operated so powerfully after his death, that the northern nations combined to attack it, and never ceased their incursions till it was totally subverted.

Plate
CXXXVIII.

CIMEX, or Bug, in zoology, a genus of insects belonging to the order of hemiptera. The rostrum is inflected. The antennæ are longer than the thorax. The wings are folded together cross-wise; the upper ones are coriaceous from their base towards their middle. The back is flat; the thorax margined. The feet are formed for running.

This genus is divided into different sections, as follows: 1. Those without wings. 2. Those in which the

escutcheon is extended so far as to cover the abdomen and the wings. 3. The coleoptrati, whose elytra are wholly coriaceous. 4. Those whose elytra are membranaceous; these are very much depressed like a leaf. 5. In which the thorax is armed on each side with a spine. 6. Those which are of an oval form, without spines on the thorax. 7. In which the antennæ become setaceous towards their point. 8. Those of an oblong form. 9. Those whose antennæ are setaceous, and as long as the body. 10. Those which have their thighs armed with spines. 11. Those whose bodies are long and narrow. Linnæus enumerates no fewer than 121 species, to which several have been added by other naturalists. A very peculiar species was discovered by Dr Sparman at the Cape, which he has named *Cimex paradoxus*. He observed it as at noon-tide he sought for shelter among the branches of a shrub from the intolerable heat of the sun. "Tho' the air (says he) was extremely still and calm, so as hardly to have shaken an aspen leaf, yet I thought I saw a little withered, pale, crumpled leaf, eaten as it were by caterpillars, flitting from the tree. This appeared to me so very extraordinary, that I thought it worth my while suddenly to quit my verdant bower in order to contemplate it: and I could scarcely believe my eyes, when I saw a live insect, in shape and colour resembling the fragment of a withered leaf, with the edges turned up and eaten away, as it were, by caterpillars, and at the same time all over beset with prickles. Nature, by this peculiar form, has certainly extremely well defended and concealed, as it were in a mask, this insect from birds and its other diminutive foes; in all probability with a view to preserve it, and employ it for some important office in the system of her economy; a system with which we are too little acquainted, in general too little investigate, and in every part of it, can never sufficiently admire with that respect and veneration which we owe to the great Author of nature and Ruler of the universe."

The larvæ of bugs only differ from the perfect insect by the want of wings; they run over plants; grow and change to chrysalids, without appearing to undergo any material difference. They have only rudiments of wings, which the last transformation unfolds, and the insect is then perfect. In the two first stages they are unable to propagate their species. In their perfect state, the female, fecundated, lays a great number of eggs, which are often found upon plants, placed one by the side of another; many of which, viewed through a glass, present singular varieties of configuration. Some are crowned with a row of small hairs, others have a circular fillet; and most have a piece which forms a cap; this piece the larva pushes off when it forces open the egg. Released by nature from their prison, they overspread the plant on which they feed, extracting, by the help of the rostrum, the juices appropriated for their nourishment; even in this state, the larvæ are not all so peaceably inclined; some are voracious in an eminent degree, and spare neither sex nor species they can conquer. In their perfect state they are mere cannibals, glutting themselves with the blood of animals; they destroy caterpillars, flies, and even the coleopterous tribe, whose hardness of elytra one would imagine was proof against

Cimicifuga gainst their attacks, have fallen an easy prey to the sharp piercing nature of the rostrum of the bug, and the incautious naturalist may experience a feeling severity of its nature. The *cimex lectularius* or house-bug, is particularly acceptable to the palate of spiders in general, and is even sought after by wood-bugs; which is not indeed surprizing, when the general voracity of this genus is considered.

The methods of expelling house-bugs are various, as oil of turpentine, the smock of corn-mint, of narrow-leaved wild cress, of herb-robert, of the reddish agaric, of mustard, Guinea pepper, peats or turf, &c. (See also BUG and CIMICIFUGA).

CIMICIFUGA, in botany: A genus of the polyandria order, belonging to the diœcia class of plants. The male calyx is almost pentaphyllous: there is no corolla; the stamina are 20 in number: the female calyx is almost pentaphyllous; no corolla; the stamina 20, and barren; the capsules from 4 to 7, polyspermous. Mesferschmidius, in the *Isis Siberica*, gives it the following character and name: *Cimicifuga fetida*, with the leaves of the herb Christopher, bearing a thyrsis of yellow male flowers with a red villous seed, the seed-vessel in form of a horn. This whole plant so resembles the *actea racemosa*, that it is difficult to distinguish them when not in flower; but in the fructification it greatly differs from it, the *cimicifuga* having four pistils, the *actea* but one. Jacquin says, that it is a native of the Carpathian mountains. It has obtained the name of *cimicifuga*, or *bugbane*, both in Siberia and Tartary, from its property of driving away those insects: and the botanists of those parts of Europe which are infested by them, have long desired to naturalise it in their several countries. Gmelin mentions, that in Siberia the natives also use it as an evacuant in dropsy; and that its effects are violently emetic and drastic.

CIMMERII, anciently a people near the Palus Mæotis. They invaded Asia Minor 1284 years before Christ, and seized upon the kingdom of Cyaxares. After they had been masters of the country for 28 years, they were driven back by Alyattes king of Lydia.—The name also of another nation on the western coast of Italy. The country which they inhabited was supposed to be so gloomy, that to express a great obscurity the expression of *Cimmerian darkness* has proverbially been used; and Homer, according to Plutarch, drew his images of hell and Pluto from the gloomy and dismal country where they dwelt.

CIMMERIUM (anc. geog.), a town at the mouth of the Palus Mæotis; from which the Bosphorus Cimmerius is named; that strait which joins the Euxine and the Palus Mæotis. *Cimmerii* was the name of the people, (Homer): and here stood the Promontorium Cimmerium, (Ptolemy); and hence probably the modern appellation *Crim*.

CIMMERIUM (anc. geog.), a place near Baiæ, in Campania, where formerly stood the cave of the sibyl. The people were called *Cimmerii*; who living in subterraneous habitations, from which they issued in the night to commit robberies and other acts of violence, never saw the light of the sun (Homer). To give a natural account of this fable, Festus says, there was a valley surrounded with a pretty high ridge, which precluded the morning and evening sun.

CIMOLIA TERRA, in natural history; a name by

which the ancients expressed a very valuable medicinal earth; but which latter ages have supposed to be no other than our tobacco-pipe clay and fuller's earth.

The cimolia terra of the ancients was found in several of the islands of the Archipelago; particularly in the island of Cimolus, from whence it has its name. It was used with great success in the erysipelas, inflammations, and the like, being applied by way of cataplasm to the part. They also used, as we do, what we call *cimolia*, or fuller's earth, for the cleansing of clothes. This earth of the ancients, though so long disregarded, and by many supposed to be lost, is yet very plentiful in Argentiere (the ancient Cimolus), Sphanto, and many of those islands. It is a marl of a lax and crumbly texture, and a pure bright white colour, very soft to the touch. It adheres firmly to the tongue; and, if thrown into water, raises a little hissing and ebullition, and moulders to a fine powder. It makes a considerable effervescence with acids, and suffers no change of colour in the fire. These are the characters of what the ancients called simply *terra cimolia*: but besides this, they had, from the same place, another earth which they called by the same general name, but distinguished by the epithet purple, *purpurescens*. This they described to be fattish, cold to the touch, of a mixed purple colour, and nearly as hard as a stone. And this was evidently the substance we call *steatites*, or the *soap rock*; common in Cornwall, and also in the island of Argentiere, or Cimolus.

CIMOLIA Alba, the official name of the earth of which we now make tobacco-pipes. Its distinguishing characters are, that it is a dense, compact, heavy earth, of a dull white colour, and very close texture; it will not easily break between the fingers, and slightly stains the skin in handling. It adheres firmly to the tongue; melts very slowly in the mouth, and is not readily diffusible in water. It is found in many places. That of the isle of Wight is much esteemed for its colour. Great plenty of it is found near Pole in Dorsetshire, and near Wedensbury in Staffordshire.

CIMOLIA Nigra, is of dark lead colour, hard, dry, and heavy; of a smooth compact texture, and not viscid: it does not colour the hands; crumbles when dry; adheres to the tongue; diffuses slowly in water; and is not acted upon by acids. It burns perfectly white, and acquires a considerable hardness. The chief pits for this clay are near Northampton, where it is used in the manufacture of tobacco-pipes. It is also mixed with the criche clay of Derbyshire, in the proportion of one part to three, in the manufacture of the hard reddish brown ware.

CIMOLUS, (anc. geog.) one of the Cyclades, now called *Argentiere*.

CIMON, an Athenian, son of Miltiades and Hegisipyle. He was famous for his debaucheries in his youth and the reformation of his morals when arrived to years of discretion. He behaved with great courage at the battle of Salamis, and rendered himself popular by his munificence and valour. He defeated the Persian fleet, took 200 ships, and totally rooted their land army, the very same day, A. U. C. 284. The money that he obtained by his victories was not applied for his own private use, but with it he fortified and embellished the city. He some time after lost all

Cinaloa his popularity, and was banished by the Athenians, who declared war against the Lacedæmonians. He was recalled from his exile; and at his return he made a reconciliation between Lacedæmon and his countrymen. He was afterwards appointed to carry on the war against Persia in Egypt and Cyprus, with a fleet of 200 ships, and on the coast of Asia he gave battle to the enemy, and totally ruined their fleet, A. U. C. 304. He died as he was besieging the town of Citium in Cyprus. He may be called the last of the Greeks whose spirit and boldness defeated the armies of the barbarians. He was such an inveterate enemy to the Persian power, that he formed a plan of totally destroying it; and in his wars he had so reduced the Persians, that they promised in a treaty not to pass the Chelidonian islands with their fleet, or to approach within a day's journey of the Grecian seas. See **ARTICA**.

CINALOA, a province of Mexico in North America, abounding in corn, cattle, and cotton; and rendered extremely picturesque, by a number of beautiful cascades of clear water that fall down from the mountains. It lies on the eastern coast of the sea of California, and has a town of the same name, situated in W. Long. 110. N. Lat. 26.

CINARA, in botany, the **ARTICHOKE**. See **CYNARA**.

CINCHONA, in botany, a genus of the monogynia order, belonging to the pentandria class of plants; and in the natural method ranking with those plants, the order of which is doubtful. The corolla is funnel-shaped, with a woolly summit; the capsule inferior, bilocular, with a parallel partition. Linnæus describes two species: 1. The corymbifera, corymb-bearing cinchona, or white Peruvian bark, with oblong lanceolate leaves and axillary corymbs; and, 2. The officinalis, or coloured Peruvian bark, with elliptic leaves downy underneath, and the leaves of the corolla woolly. Both species are natives of Peru, where the trees attain the height of 15 to 20 feet. The former particularly abounds in the hilly parts of Quito, growing promiscuously in the forests, and is spontaneously propagated from its seed. Both sorts have also been found in the province of Santa Fe.

The bark has some odour, to most people not unpleasant, and very perceptible in the distilled water, in which floating globules, like essential oil, have been observed. Its taste is bitter and astringent, accompanied with a degree of pungency, and leaving a considerably lasting impression on the tongue.

According to some, the Peruvians learned the use of the bark by observing certain animals affected with intermittents instinctively led to it; while others say, that a Peruvian having an ague, was cured by happening to drink of a pool which, from some trees having fallen into it, tasted of cinchona; and its use in gangrene is said to have originated from its curing one in an aguish patient. About the year 1640, the lady of the Spanish viceroy, the Comitissa del Cinchon, was cured by the bark, which has therefore been called *Cortex* or *Pulvis Comitissæ*, *Cinchona*, *Chinachina*, or *Chinchina*, *Kinakina* or *Kinkina*, *Quinaquina* or *Quinquina*; and from the interest which the Cardinal de Lugo and the Jesuit fathers took in its distribution, it has been called *Cortex* or *Pulvis Cardinalis de Lugo*, *Jesuiticus*, *Patrum*, &c.

On its first introduction into Europe, it was reprobated by many eminent physicians; and at different periods long after, it was considered a dangerous remedy; but its character, in process of time, became very universally established. For a number of years, the bark which is rolled up into short thick quills, with a rough coat, and a bright cinnamon colour in the inside, which broke brittle, and was found, had an aromatic flavour, a bitterish astringent taste, with a degree of aromatic warmth, was esteemed the best: though some esteemed the large pieces as of equal goodness. During the time of the late war, in the year 1779, the Hussar frigate took a Spanish ship, loaded principally with Peruvian bark, which was much larger, thicker, and of a deeper reddish colour, than the bark in common use. Soon after it was brought to London, it was tried in St Bartholomew's Hospital, and in other hospitals about town, and was said to be more efficacious than the quill bark. This put practitioners on examining into the history of the bark, on trying experiments with it, and on making comparative trials of its effects with those of the bark in common use on patients labouring under intermitting complaints. In July 1782, Dr William Saunders published an account of this red bark; in which he says, that the small quill bark used in England, is either the bark of young trees, or of the twigs or branches of the old ones; and that the large bark, called the *red bark* from the deep colour, is the bark of the trunk of the old trees; and he mentions a Mr Arnot, who himself gathered the bark from the trees in Peru; and Monf. Condaminé, who gives an account of the tree in the Memoirs of the Academy of Sciences at Paris in the year 1738; who both say, that taking the bark from an old tree effectually kills it; but that most of the young trees which are barked, recover, and continue healthy; and that for these reasons the Spaniards now barked the younger trees for foreign markets, though they still imported into Spain some of the bark of the old trees, which they esteemed to be much more efficacious than what was got from the young. From these accounts Dr Saunders concludes, that the large red bark brought to London in the year 1779 was of the same kind as that used by Sydenham and Morton, as it answers to the description of the bark used in their time, which is given by Dale and other writers on the materia medica, who were their contemporaries. Dr Saunders says, that it is not only stronger and more refinous, but likewise more efficacious and certain in its effect, than the common bark, and had cured many agues after the other had failed.

A species of cinchona has also been discovered in the West India islands, particularly in Jamaica: It is accurately described by Dr Wright, under the title of *Cinchona Jamaicensis*, in a paper published in the Philosophical Transactions. In Jamaica it is called the *sea-side beech*, and grows from 20 to 40 feet high. The white, furrowed, thick outer bark is not used; the dark-brown inner bark has the common flavour, with a mixed kind of a taste, at first of horse-radish and ginger, becoming at last bitter and astringent. It seems to give out more extractive matter than the cinchona officinalis. Some of it was imported from St Lucia, in consequence of its having been used with advantage in the army and navy during the last war; and it has lately been treated of at considerable length by

Dr

Cinchona. Dr Kentish, under the title of *St Lucia bark*. The fresh bark is found to be considerably emetic and cathartic, which properties it is said to lose on drying.

The pale and the red are chiefly in use in Britain. The pale is brought to us in pieces of different sizes, either flat or quilled, and the powder is rather of a lighter colour than that of cinnamon. The red is generally in much larger, thicker, flattish pieces, but sometimes also in the form of quills, and its powder is reddish like that of Armenian bole. As already observed, it is much more resinous, and possesses the sensible qualities of the cinchona in a much higher degree than the other sorts; and the more nearly the other kinds resemble the red bark, the better they are now considered. The red bark is heavy, firm, sound, and dry; friable between the teeth; does not separate into fibres; and breaks, not shivery, but short, close, and smooth. It has three layers: the outer is thin, rugged, of a reddish brown colour, but frequently covered with mossy matter: the middle is thicker, more compact, darker coloured, very resinous, brittle, and yields first to the pestle: the inmost is more woody, fibrous, and of a brighter red.

The Peruvian bark yields its virtues both to cold and boiling water; but the decoction is thicker, gives out its taste more readily, and forms an ink with a chalybeate more suddenly than the fresh cold infusion. This infusion, however, contains at least as much extractive matter, but more in a state of solution; and its colour, on standing some time with the chalybeate, becomes darker, while that of the decoction becomes more faint. When they are of a certain age, the addition of a chalybeate renders them green; and when this is the case, they are found to be in a state of fermentation, and effete. Mild or caustic alkalies, or lime, precipitate the extractive matter, which in the case of the caustic alkali is redissolved by a farther addition of the alkali. Lime-water precipitates less from a fresh infusion than from a fresh decoction; and in the precipitate of this last some mild earth is perceptible. The infusion is by age reduced to the same state with the fresh decoction, and then they deposit nearly an equal quantity of mild earth and extractive matter; so that lime-water, as well as a chalybeate, may be used as a test of the relative strength and perishable nature of the different preparations, and of different barks. Accordingly cold infusions are found by experiments to be less perishable than decoctions; infusions and decoctions of the red bark than those of the pale; those of the red bark, however, are found by length of time to separate more mild earth with the lime-water, and more extracted matter. Lime-water, as precipitating the extracted matter, appears an equally improper and disagreeable menstruum.

Water is found to suspend the resin by means of much less gum than has been supposed. Rectified spirit of wine extracts a bitterness, but no astringency, from a residuum of 20 effusions of cold water; and water extracts astringency, but no bitterness, from the residuum of as many affusions of rectified spirit. The residua in both are insipid.

From many ingenious experiments made on the Peruvian bark by Dr Irvine, which are now published in a dissertation which gained the prize-medal given by the Harveian Society of Edinburgh for 1783, the

power of different menstrea, as acting upon Peruvian bark, is ascertained with greater accuracy than had before been done; and it appears, that with respect to comparative power, the fluids after mentioned act in the order in which they are placed.

Dulcified spirit of vitriol.

Caustic ley.

French brandy.

Rhenish wine.

Soft water.

Vinegar and water.

Dulcified spirit of nitre.

Mild volatile alkali.

Rectified spirit of wine.

Mild vegetable alkali.

Lime-water.

The antiseptic powers of vinegar and bark united are double the sum of those taken separately. The astringent power of the bark is increased by acid of vitriol; the bitter taste is destroyed by it.

The officinal preparations of the bark are, 1. The powder: of this, the first parcel that passes the sieve being the most resinous and brittle layer, is the strongest. 2. The extract: the watery and spirituous extract conjoined form the most proper preparations of this kind. 3. The resin: this cannot perhaps be obtained separate from the gummy part, nor would it be desirable. 4. Spirituous tincture: this is best made with proof-spirit. 5. The decoction: this preparation, tho' frequently employed, is yet in many respects inferior even to a simple watery infusion.

The best form is that of powder: in which the constituent parts are in the most effectual proportion. The cold infusion, which can be made in a few minutes by agitation, the spirituous tincture, and the extract, are likewise proper in this respect. For covering the taste, different patients require different vehicles; liquorice, aromatics, acids, port-wine, small beer, porter, milk, butter-milk, &c. are frequently employed; and those who dislike the taste of the bark itself, vary in their accounts to which the preference is due; or it may be given in form of electuary with currant-jelly, or with brandy or rum.

Practitioners have differed much with regard to the mode of operation of the Peruvian bark. Some have ascribed its virtues entirely to a stimulant power. But while the strongest and most permanent stimuli have by no means the same effect with bark in the cure of diseases, the bark itself shows hardly any stimulant power, either from its action on the stomach, or on other sensible parts to which it is applied. From its action on dead animal fibres, there can be no doubt of its being a powerful astringent; and from its good effects in certain cases of disease, there is reason to presume that it is a still more powerful tonic. To this tonic power some think that its action as an antiseptic is to be entirely attributed: but that, independently of this, it has a very powerful effect in resisting the septic process to which animal substances are naturally subjected, appears beyond all dispute, from its effects in resisting putrefaction, not only in dead animal solids, but even in animal fluids, when entirely detached from the living body.

But although it be admitted that the Peruvian bark acts powerfully as an astringent, as a tonic, and as an anti-

Cinchona.

Cinchona.

antiseptic; yet these principles will by no means explain all the effects derived from it in the cure of diseases. And accordingly, from no artificial combination in which these powers are combined, or in which they exist even to a higher degree, can the good consequences resulting from Peruvian bark be obtained. Many practitioners, therefore, are disposed to view it as a specific. If by a specific we mean an infallible remedy, it cannot indeed be considered as intitled to that appellation; but in as far as it is a very powerful remedy, of the operation of which no satisfactory explanation has yet been given, it may with great propriety be denominated a specific. But whatever its mode of operation may be, there can be no doubt that it is daily employed with success in a great variety of different diseases.

It was first introduced, as has already been said, for the cure of intermittent fevers; and in these, when properly exhibited, it rarely fails of success. Practitioners, however, have differed with regard to the best mode of exhibition; some prefer giving it just before the fit, some during the fit, others immediately after it. Some, again, order it in the quantity of an ounce between the fits; the dose being the more frequent and larger according to the frequency of the fits; and this mode of exhibition, although it may perhaps sometimes lead to the employment of more bark than is necessary, we consider as upon the whole preferable, from being best suited to most stomachs. The requisite quantity is very different in different cases; and in many vernal intermittents it seems even hardly necessary.

It often pukes or purges, and sometimes oppresses the stomach. These, or any other effects that may take place, are to be counteracted by remedies particularly appropriated to them. Thus, vomiting is often restrained by exhibiting it in wine; looseness by combining it with opium; and oppression at stomach, by the addition of an aromatic. But unless for obviating particular occurrences, it is more successful when exhibited in its simple state than with any addition; and there seems to be little ground for believing that its powers are increased by crude sal ammoniac, or any other additions which have frequently been made.

It is now given from the very commencement of the disease, without previous evacuations, which, with the delay of the bark, or under doses of it, by retarding the cure, often seem to induce abdominal inflammation, scirrhus, jaundic, hectic, dropsy, &c. symptoms formerly imputed to the premature or intemperate use of the bark, but which are best obviated by its early and large use. It is to be continued not only till the paroxysms cease, but till the natural appetite, strength, and complexion, return. Its use is then to be gradually left off, and repeated at proper intervals to secure against a relapse; to which, however unaccountable, independently of the recovery of vigour, there often seems to be a peculiar disposition; and especially when the wind blows from the east. Although, however, most evacuations conjoined with the Peruvian bark in intermittents are rather prejudicial than otherwise, yet it is of advantage, previous to its use, to empty the alimentary canal, particularly the stomach; and on this account good effects are often obtained from premising an emetic.

It is a medicine which seems not only suited to both formed and latent intermittents, but to that state of fibre on which all rigidly periodical diseases seem to depend; as periodical pain, inflammation, hemorrhagy, spasm, cough, loss of external sense, &c.

Bark is now used by some in all continued fevers; at the same time attention is paid to keep the bowels clean, and to promote when necessary the evacuation of redundant bile; always, however, so as to weaken as little as possible.

In confluent small-pox, it promotes languid eruption and suppuration, diminishes the fever through the whole course of it, and prevents or corrects putrescence and gangrene.

In gangrenous sore throats it is much used, as it is externally and internally in every species of gangrene.

In contagious dysentery, after due evacuation, it has been used by the mouth, and by injection with and without opium.

In all those hemorrhagies called *passive*, and which it is allowed all hemorrhagies are very apt to become, and likewise in other increased discharges, it is much used; and in certain undefined cases of hæmoptysis, some allege that it is remarkably effectual when joined with an absorbent.

It is used for obviating the disposition to nervous and convulsive diseases; and some have great confidence in it joined with the acid of vitriol, in cases of phthisis, scrophula, ill-conditioned ulcers, rickets, scurvy, and in states of convalescence.

In these cases in general, notwithstanding the use of the acid, it is proper to conjoin it with a milk diet.

In dropsy, not depending on any particular local affection, it is often alternated or conjoined with diuretics, or other evacuations; and by its early exhibition after the water is once drawn off, or even begins to be freely discharged, a fresh accumulation is prevented, and a radical cure obtained. In obstinate venereal cases, particularly those which appear under the form of pains in the bones, the Peruvian bark is often successfully subjoined to mercury, or even given in conjunction with it.

CINCINNATUS, the Roman dictator, was taken from the plough, to be advanced to the dignity of consul; in which office he restored public tranquillity, and then returned to his rural employments. Being called forth a second time to be dictator, he conquered the enemies of Rome, and, refusing all rewards, retired again to his farm, after he had been dictator only 16 days. The same circumstance appeared once more in the 80th year of his age. He died 376 years before Christ.

Order of CINCINNATUS, or the *Cincinnati*, a society which was established in America soon after the peace, and consists of the generals and officers of the army and navy of the United States. This institution, called after the name of the Roman dictator mentioned in the preceding article, was intended to perpetuate the memory of the revolution, the friendship of the officers, and the union of the states; and also to raise a fund for the relief of poor widows and orphans whose husbands and fathers had fallen during the war, and for their descendants. The society was subdivided into state societies, which were to meet on the

Cincture
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Cinnabar.

4th of July, and with other business depute a number of their members to convene annually in general meetings. The members of the institution were to be distinguished by wearing a medal, emblematical of the design of the society: and the honours and advantages were to be hereditary in the eldest male heirs, and, in default of male issue, in the collateral male heirs. Honorary members were to be admitted, but without the hereditary advantages of the society, and provided their number should never exceed the ratio of one to four of the officers or their descendants. Though the apparent designs of this society were harmless and honourable, it did not escape popular jealousy. Views of a deeper nature were imputed to the framers; and the institution was censured and opposed as giving birth to a military nobility, of a dangerous aristocratic power, which might ultimately prove ruinous to the liberties of the new empire. But the principal ground of apprehension was the supposed right of inheritance connected with this honour to render it hereditary; which, however, hath been given up and totally disclaimed by the society.

CINCTURE, in architecture, a ring, list, or orlo, at the top and bottom of the shaft of a column, separating the shaft at one end from the base, and at the other from the capital.

CINEAS, a Thessalian, minister and friend to Pyrrhus king of Epirus. He was sent to Rome by his master to sue for a peace, which he, however, could not obtain. He told Pyrrhus that the Roman senate was a venerable assembly of kings; and observed, that to fight with them was to fight against another Hydra. He was of such a retentive memory, that the day after his arrival at Rome he could call every senator and knight by his name.

CINERITIOUS, an appellation given to different substances, on account of their resembling ashes either in colour or consistence; hence it is that the cortical part of the brain has sometimes got this epithet.

CINNA (L. Corn.), a Roman who oppressed the republic with his cruelties. He was banished by Octavius for attempting to make the fugitive slaves free. He joined himself with Marius; and with him at the head of the slaves he defeated his enemies, and made himself consul even to a fourth time. He massacred so many citizens at Rome, that his name became odious; and one of his officers assassinated him at Antona, as he was preparing war against Sylla.

CINNA (C. Helvius), a poet intimate with Cæsar. He went to attend the obsequies of Cæsar, and being mistaken by the populace for the other Cinna, he was torn to pieces.—Also a grandson of Pompey's. He conspired against Augustus, who pardoned him, and made him one of his most intimate friends. He was consul A. U. C. 758, and made Augustus his heir.

CINNABAR, in natural history, is either native or factitious.

The *native* cinnabar is an ore of quicksilver, moderately compact, very heavy, and of an elegant striated red colour.

Factitious cinnabar is a mixture of mercury and sulphur sublimed, and thus reduced into a fine red glebe. The best is of a high colour, and full of fibres like needles. See **CHEMISTRY**, n° 1404,

The chief use of cinnabar is for painting. Although

the body is composed of sulphur, which is of a light colour, and mercury which is white as silver, it is nevertheless of an exceeding strong red colour. Lumps of it are of a deep brown red without brilliancy; but when the too great intensity of its colour is diminished by bruising and dividing it into small parts, (which is a method generally used to lessen the intensity of all colours), the red of the cinnabar becomes more and more exalted, flame-coloured, and exceedingly vivid and brilliant: in this state it is called *vermillion*.

Cinnabar is often employed as an internal medicine. Hoffman greatly recommends it as a sedative and antispasmodic: and Stahl makes it an ingredient in his *temperant powder*. Other intelligent physicians deny that cinnabar taken internally has any medicinal quality. Their opinion is grounded on the insolubility of this substance in any menstruum. This question concerning its internal utility cannot be decided without further researches and experiments; but cinnabar is certainly used with success to procure a mercurial fumigation, when that method of cure is proper in venereal diseases. For this purpose it is burnt in an open fire on red-hot coals, by which the mercury is disengaged and forms vapours, which, being applied to the body of the diseased person, penetrate through the pores of the skin, and produce effects similar to those of mercury administered by friction.

CINNAMON, the bark of two species of *laurus*. The true cinnamon is from the *laurus cinnamomum*; and the base cinnamon, which is often sold for the true, is from the *laurus cassia*. See **LAURUS**.

CINNAMON-water, is made by distilling the bark first infused in spirit of wine, brandy, or white-wine.

Clove-CINNAMON, is the bark of a tree-growing in Brazil, which is often substituted for real cloves.

White CINNAMON, called also *Winter's bark*, is the bark of a tree frequent in the isle of St Domingo, Guadalupe, &c. of a sharp biting taste like pepper. Some use it instead of nutmeg; and in medicine it is esteemed a stomachic and antiscorbutic. See **CANELLA**.

CINNAMUS, a Greek historian, wrote a history of the eastern empire, during the reigns of John and Manuel Commenes, from 1118 to 1143. His style is reckoned the best of the modern Greek authors. He died after 1183.

CINNERETH, **CINERETH**, *Chinnereth*, (Moses); or *Gennesareth*, (anc. geog.) a lake of the Lower Galilee; called the *Sea of Galilee*, (Matthew); of *Tiberias*, (John). Its name *Gennesareth* is from a small cognominal district upon it. In breadth 40 stadia, in length 140. The water fresh and fit to drink, and abounding in fish.

CINQUEFOIL, in botany. See **POTENTILLA**.

CINQUE-PORTS, five havens that lie on the east part of England, towards France; thus called by way of eminence on account of their superior importance, as having been thought by our kings to merit a particular regard for their preservation against invasion. Hence they have a particular policy, and are governed by a keeper with the title of *Lord-warden of the Cinque-ports*.

Cambden tells us, that William the Conqueror first

Cinnamon
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Cinque.

Cinque
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Cinyras.

appointed a warden of the Cinque-ports: but King John first granted them their privileges; and that upon condition they should provide 80 ships at their own charge for 40 day, as often as the king should have occasion in the wars; he being then straitened for a navy to recover Normandy.

The five ports are, Hastings, Romney, Hythe, Dover, and Sandwich.—Thorn tells us, that Hastings provided 21 vessels, and in each vessel 21 men. To this port belong Seaford, Pevensey, Hedney, Winchelsey, Rye, Hamine, Wakebourn, Creneth, and Forthcliffe.—Romney provided five ships, and in each 24 men. To this belong Bromhal, Lyde, Ofwarstone, Dangemares, and Romenhal.—Hythe furnished five ships, and in each 21 seamen. To this belongs Westmeath.—Dover the same number as Hastings. To this belong Folkston, Feverham, and Marge.—Lastly, Sandwich furnished the same with Hythe. To this belong Fordiwic, Reculver, Serre, and Deal.

The privileges granted to them in consequence of these services were very great. Amongst others, they were each of them to send two barons to represent them in parliament; their deputies were to bear the canopy over the king's head at the time of his coronation, and to dine at the uppermost table in the great hall on his right hand; to be exempted from subsidies and other aids; their heirs to be free from personal wardship, notwithstanding any tenure; to be impleaded in their own towns, and not elsewhere; not to be liable to tolls, &c.

The Cinque-ports give the following titles: Hastings, a barony to the ancient family of Huntington: Romney, to the Marshams: Dover, new barony, to a branch of the York family; formerly a dukedom (now extinct) to the Queensberry family: Sandwich, an earldom to a branch of the Montagues.

CINTRA, a cape and mountain of Portugal, in the province of Estremadura, usually called the *Rock of Lisbon*. It lies on the north side of the entrance of the river Tajo; and there is a town of the same name situated thereon. W. Long. 10. 15. N. Lat. 39. 0.

CINUS, or CYNUS, a famous civilian of Pistoia in the 14th century. His commentary on the Code was finished in 1313: he also wrote on some parts of the digest. He was no less famous for his Italian poems; and is ranked among those who first gave graces to the Tuscan lyric poetry.

CINYRA, in the Jewish antiquities, a musical instrument. This, and the Hebrew *cinnor*, which is generally translated *cithera*, *lyra*, or *psalterium*, are the same. It was made of wood, and was played on in the temple of Jerusalem. Josephus says that the *cinyra* of the temple had ten strings, and that it was touched with a bow. In another place he says that Solomon made a great number of them with a precious kind of metal called *electrum*; wherein he contradicts the scriptures, which inform us that Solomon's *cinnors* were made of wood.

CINYRAS, (fab. hist.) a king of Cyprus, son of Paphus. He married Cenchreis, by whom he had a daughter called *Myrrha*. Myrrha fell in love with her father, and in the absence of her mother she introduced herself into his bed by means of her nurse. Cinyras had by her a son called *Adonis*; and when he knew the incest he had committed, he attempted to stab his

daughter, who escaped his pursuit and fled to Arabia, where, after she had brought forth, she was changed into a tree which still bears her name. Cinyras, according to some, stabbed himself.

CION, or CROX, in gardening, a young shoot, sprout, or sprig, put forth by a tree. Grafting is performed by the application of the cion of one plant upon the stock of another. To produce a stock of cions for grafting, planting, &c. the gardeners sometimes cut off the bodies of trees a little above the ground, and only leave a stump or root standing: the redundant sap will not fail next spring to put forth a great number of shoots. In dressing dwarf-trees, a great many cions are to be cut off.

CIOTAT, a sea-port town of Provence in France; famous for Muscadine wine. It is seated on the bay of Laquea, between Marseilles and Toulon; and the harbour is defended by a strong fort. E. Long. 5. 30. N. Lat. 43. 10.

CIPHER, or CYPHER, one of the Arabic characters or figures used in computation, formed thus, 0. See ARITHMETIC.

CIPHER is also a kind of enigmatic character, composed of several letters interwoven, which are generally the initial letters of the persons names for whom the ciphers are intended. These are frequently used on seals, coaches, and other moveables.—Anciently merchants and tradesmen were not allowed to bear arms; in lieu thereof, they bore their ciphers, or the initial letters of their names, artfully interwoven about a cross; of which we have divers instances on tombs. &c. See DEVISE.

CIPHER, denotes likewise certain secret characters disguised and varied, used in writing letters that contain some secret, not to be understood but by those between whom the cipher is agreed on.

De la Guilletiere, in his *Lacedemon ancient and modern*, endeavours to make the ancient Spartans the inventors of the art of writing in cipher. Their scytala, according to him, was the first sketch of this mysterious art: these scytalæ were two rollers of wood, of equal length and thickness; one of them kept by the ephori; the other by the general of the army sent on any expedition against the enemy. Whensoever those magistrates would send any secret orders to the general, they took a slip of parchment, and rolled it very justly about the scytala which they had reserved; and in this state wrote their intentions, which appeared perfect and consistent while the parchment continued on the roll: when taken off, the writing was maimed, and without connection: but was easily retrieved by the general, upon his applying it to his scytala.

Polybius says, that Æneas Tactitus, 2000 years ago, collected together 20 different manners of writing so as not to be understood by any but those in the secret; part whereof were invented by himself, and part used before his time.—Trithemius, Cap. Porta, Vigenere, and P. Nicéron, have written expressly on the subject of *Ciphers*.

As the writing in cipher is become an art; so is the reading or unravelling thereof, called *deciphering*.—The rules of deciphering are different in different languages. By observing the following, you will soon make out any common cipher written in English.

Cion
||
Cipher.

Cipher.

1. Observe the letters or characters that most frequently occur; and set them down for the six vowels, including *y*; and of these the most frequent will generally be *e*, and the least frequent *u*.

2. The vowels that most frequently come together are *ea* and *ou*.

3. The consonant most common at the ends of words is *s*, and the next frequent *r* and *t*.

4. When two similar characters come together, they are most likely to be the consonants *f*, *l*, or *s*, or the vowels *e* or *o*.

5. The letter that precedes or follows two similar characters, is either a vowel, or *l*, *m*, *n*, or *r*.

6. In deciphering, begin with the words that consist of a single letter, which will be either *a*, *I*, *o*, or *U*.

7. Then take the words of two letters, one of which will be a vowel. Of these words the most frequent are, *an*, *o*, *be*, *by*, *of*, *on*, *or*, *no*, *so*, *as*, *at*, *if*, *in*, *is*, *it*, *he*, *me*, *my*, *us*, *we*, *am*.

8. In words of three letters there are most commonly two consonants. Of these words the most frequent are, *the*, *and*, *not*, *but*, *yet*, *for*, *tho'*, *how*, *why*, *all*, *you*, *she*, *his*, *her*, *our*, *who*, *may*, *can*, *did*, *was*, *are*, *has*, *had*, *let*, *one*, *two*, *six*, *ten*, &c. — Some of these, or those of two letters, will be found in every sentence.

9. The most common words of four letters are, *this*, *that*, *then*, *thus*, *with*, *when*, *from*, *here*, *some*, *most*, *none*, *they*, *them*, *whom*, *mine*, *your*, *self*, *must*, *will*, *have*, *been*, *were*, *four*, *five*, *nine*, &c.

10. The most usual words of five letters are, *there*, *these*, *those*, *which*, *were*, *while*, *since*, *their*, *shall*, *might*, *could*, *would*, *ought*, *three*, *seven*, *eight*, &c.

11. Words of two or more syllables frequently begin with double consonants, or with a preposition; that is, a vowel joined with one or more consonants. The most common double consonants are, *bl*, *br*, *dr*, *fl*, *fr*, *gl*, *gr*, *ph*, *pl*, *pr*, *sb*, *sh*, *sp*, *st*, *th*, *tr*, *wh*, *wr*, &c. and the most common prepositions are, *com*, *con*, *de*, *dis*, *ex*, *im*, *in*, *int*, *mis*, *per*, *pre*, *pro*, *re*, *sub*, *sup*, *un*, &c.

12. The double consonants most frequent at the end of long words are, *ck*, *ld*, *lf*, *mn*, *nd*, *ng*, *rl*, *rm*, *rn*, *rp*, *rt*, *sm*, *st*, *xt*, &c. and the most common terminations are, *ed*, *en*, *er*, *es*, *et*, *ing*, *ly*, *son*, *sion*, *tion*, *able*, *ence*, *ent*, *ment*, *full*, *less*, *ness*, &c.

* In
Vol. IV.

On Plate CXXXVII.* fig. 7. is given an example of a cipher wrote in arbitrary characters as is commonly practised. It will be easily deciphered by observing the rules: but when the characters are all placed close together, as in the example fig. 8. and as they always should be, the deciphering is much more difficult.

To decipher a writing of this sort, you must first look for those characters that most frequently occur, and set them down for vowels as before. Then observe the similar characters that come together; but you must remember that two such characters may here belong to two words. You are next to remember the combinations of two or three characters that are most frequent; which will be some of the words in the seventh and eighth of the foregoing rules; and by observing the other rules, you will infallibly discover, with time and attention, any cipher wrote on these principles.

When the words are wrote all close together, if the key to the cipher were to be changed every word, according to a regular method agreed on be

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tween the parties, as might be done by either of the methods mentioned in N^o II. below, with very little additional trouble, the writing would then be extremely difficult to decipher. The longer any letter wrote in cipher is, the more easy it is to decipher, as then the repetitions of the characters and combinations are the more frequent.

The following are the contents of the two foregoing ciphers; in which we have inverted the order of the words and letters, that they who are desirous of trying their talent at deciphering, may not, inadvertently, read the explanation before the cipher.

enil eno ton dna shtnom elohw eerht, suoidisrep dna leure o. noituac & ecnedurp fo klat lliw uoy: on, rotiait, teelgen & ecnereffidni si ti. yltrohs rettela em dnes ot snaem emof dnif rehtie, traeh eht morf semoc ti taht ees em tel &, erom ecaf ym ees ot erab reven ro.

evlewt fo ruoh eht ta thgin siht, ledatic eht fo etag eht erofeb elbmessa lliw sdneirf ruo lla. ruoh eht ot lautenu eb: deraperp llew emoc dna, ytrebil ruoy niager ot, ylevarb eid ro. thgin eht si siht, su sekam rehtie taht, etiuq su seodnu ro.

Contrivances for communicating intelligence by CIPHER

I. By means of a pack of cards. The parties must previously agree in what manner the cards shall be first placed, and then how they shall be shuffled. Thus suppose the cards are to be first placed in the order as hereafter follows, and then shuffled by taking off 3 from the top, putting the next 2 over them, and the following 3 under them †, and so alternately. Therefore the party who sends the cipher first writes the contents of it on a separate paper, and then copies the first 32 letters on the cards, by writing one letter on every card; he then shuffles them, in the manner described, and writes the second 32 letters: he shuffles them a second time, and writes the third 32 letters, and so of the rest. An example will make this plain. Suppose the letter to be as follows:

I am in full march to relieve you; within three days I shall be with you. If the enemy in the mean time should make an assault, remember what you owe to your country, to your family, and yourself. Live with honour, or die with glory.

Order of the cards before the 1st shuffle.

Ace spade	i a d u y i
Ten diamonds	a l e u l
Eight hearts	m l m o i u
King spades	i s u m l
Nine clubs	n b l e o
Seven diamonds	f b m r i
Nine diamonds	u e a c t n
Ace clubs	l w k r y i
Knave hearts	l s e e a e
Seven spades	m i a r m w
Ten clubs	a i t h e r
Ten hearts	r r h o f
Queen spades	c h e e i
Eight diamonds	b a b y w
Eight clubs	t y o o o l
Seven hearts	o y a o b o
Queen clubs	r o n u y b
Nine spades	e u i y f y
King hearts	l e t e u o

C

Queen

Cipher.

Cipher.

Queen diamonds	<i>i d s o e</i>
Eight spades	<i>e i n w s o</i>
Knave clubs	<i>v f a n t g</i>
Seven clubs	<i>e t s l y</i>
Ace hearts	<i>y r e b r</i>
Nine hearts	<i>o l n w o t</i>
Ace diamonds	<i>u b s t & d</i>
Knave spades	<i>w l m a l</i>
Ten spades	<i>i e y t r r</i>
King diamonds	<i>t t i b u r</i>
Queen hearts	<i>b h m m u</i>
King clubs	<i>i n a t h</i>
Knave diamonds	<i>n e r u o</i>

The person that receives these cards first places them in the order agreed on, and transcribes the first letter on every card. He then shuffles them, according to order, and transcribes the second letter on each card. He shuffles them a second time, and transcribes the third letters: and so of the rest.

If the cards were to be shuffled the second time by threes and fours, the third time by twos and fours, &c. it would make the cipher still more difficult to discover: though as all ciphers depend on the combination of letters, there are scarce any that may not be deciphered with time and pains; as we shall show further on. Those ciphers are the best that are by their nature most free from suspicion of being ciphers; as for example, if the letters were there wrote with sympathetic ink, the cards might then pass for a common pack.

II. *By a dial.* On a piece of square pasteboard ABCD, fig. 3. 4. draw the circle EFGH, and divide it into 26 equal parts, in each of which must be wrote one of the letters of the alphabet.

On the inside of this there must be another circle of pasteboard, ILMN, moveable round the centre O, and the extremity of this must be divided into the same number of equal parts as the other. On this also must be wrote the letters of the alphabet, which, however, need not be disposed in the same order. The person with whom you correspond must have a similar dial, and at the beginning of your letter you must put any two letters that answer to each other when you have fixed the dial.

Exam. Suppose you would write as follows: "If you will come over to us, you shall have a pension, and you may still make a sham opposition." You begin with the letters *Ma*, which show how the dial is fixed: then for *If you*, you write *un juc*, and so for the rest, as you will see at fig. 6.

The same intention may be answered by a ruler, the upper part of which is fixed and the lower part made to slide; but in this case the upper part must contain two alphabets in succession, that some letter of that part may constantly correspond to one in the lower part. The divisions standing directly over each other in a straight line will be much more obvious than in the circumference of a circle. Or two straight pieces of pasteboard regularly divided, the one containing a single and the other a double alphabet, would answer exactly the same purpose. In this case a blank space may be left at each end of the single alphabet, and one or two weights being placed on both the pieces will keep them steady.

III. *The corresponding spaces.* Take two pieces of

pasteboard or stiff paper, through which you must cut long squares, at different distances, as you will see in the following example. One of these pieces you keep yourself, and the other you give to your correspondent. When you would send him any secret intelligence, you lay the pasteboard upon a paper of the same size; and in the spaces cut out, you write what you would have understood by him only, and then fill up the intermediate spaces with somewhat that makes with those words a different sense.

[I shall be] much obliged to you, as reading [alone] engages my attention [at] present, if you will lend me any one of the [eight] volumes of the Spectator. I hope you will excuse [this] freedom; but for a winter's evening I [don't] know a better entertainment. If I [fail] to return it soon, never trust me for the time [to come.]

A paper of this sort may be placed four different ways, either by putting the bottom at the top, or by turning it over; and by these means the superfluous words may be the more easily adapted to the sense of the others.

This is a very eligible cipher, as it is free from suspicion, but it will do only for short messages: for if the spaces be frequent, it will be very difficult to make the concealed and obvious meanings agree together: and if the sense be not clear, the writing will be liable to suspicion.

IV. *The musical cipher.* The construction of this cipher is similar to that of N° II. The circle EFGH (fig. 3.) is to be divided into twenty-six equal parts, in each part there must be wrote one of the letters of the alphabet: and on the anterior circle ILMN, moveable round the centre O, there is to be the same number of divisions: the circumference of the inner circle must be ruled in the manner of a music paper; and in each division there is to be placed a note, differing either in figure or position. Lastly, within the musical lines place the three keys, and on the outer circle, the figures that are commonly used to denote the time.

Then provide yourself with a ruled paper, and place one of the keys, as suppose that of *ge re sol*, against the time two-fourths at the beginning of the paper, which will inform your correspondent how to fix his circle. You then copy the notes that answer to the several letters of the words you intend to write, in the manner expressed at fig. 5.

A cipher of this sort may be made more difficult to discover by frequently changing the key, and that will not in the least embarrass the reader. You may likewise add the mark $\times$ or $\flat$ to the note that begins a word, which will make it more easy to read, and at the same time give the music a more natural aspect. This cipher is preferable to that of N° II. above, as it may be inclosed in a letter about common affairs, and pass unsuspected.

CIPPUS, in antiquity, a low column, with an inscription, erected on the high roads, or other places, to show the way to travellers; to serve as a boundary; to mark the grave of a deceased person, &c.

Cipher,
Cippus.

CIP

Cir
||
Circassia.

CIR (St), a village of France, two miles from Versailles, remarkable for a nunnery founded here by Louis XIV. The nuns are obliged to take care of the education of 250 girls, who must prove their families to have been noble from the 4th generation on the father's side. They cannot enter before 7, nor after 12, years of age: and they continue there till they are 20 years and 3 months old. The house is a most magnificent structure.

CIRCÆA, ENCHANTER'S NIGHT-SHADE: A genus of the monogynia order, belonging to the diandria class of plants; and in the natural method ranking under the 48th order, *Aggregata*. The corolla is dipetalous; the calyx diphyllous, superior, with one bilocular seed. There are two species, one of which is a native of Britain, and the other of Germany. They are low herbaceous plants with white flowers, and possessed of no remarkable property.

CIRCASSIA, a large country of Asia, situated between 45 and 50 degrees of north latitude, and between 40 and 50 of east longitude. It is bounded by Russia on the north; by Astracan and the Caspian sea on the east; by Georgia and Dagistan on the south; and by the river Don, the Palus Meotis, and the Black Sea, on the west. This country has long been celebrated for the extraordinary beauty of its women; and here it was that the practice of inoculating for the small-pox first began. Terki, the principal city, is seated in a very spacious plain, very swampy, towards the sea-side, in 43 deg. 23 min. north latitude; it is about three wersts in compass, well fortified with ramparts and bastions in the modern style, well stored with cannon, and has always a considerable garrison in it, under the command of a governor. The Circassian prince who resides here, is allowed five hundred Russians for his guard, but none of his own subjects are permitted to dwell within any part of the fortifications. Ever since the reduction of those parts to the obedience of Russia, they have put in all places of strength, not only Russian garrisons and governors, but magistrates, and priests for the exercise of the Christian religion; yet the Circassian Tartars are governed by their own princes, lords, and judges; but these administer justice in the name of the emperor, and in matters of importance, not without the presence of the Russian governors, being all obliged to take the oath of allegiance to his Imperial majesty. The apparel of the men of Circassia is much the same with that of the Nagayans: only their caps are something larger; and their cloaks being likewise of coarse cloth or sheep skins, are fastened only at the neck with a string, and as they are not large enough to cover the whole body, they turn them round according to the wind and weather. The men here are much better favoured than those of Nagaya, and the women extremely well shaped, with exceeding fine features, smooth clear complexions, and beautiful black eyes, which, with their black hair hanging in two tresses, one on each side the face, give them a most lovely appearance: they wear a black coif on their heads, covered with a fine white cloth tied under the chin. During the summer they all wear only a smock of divers colours, and that open so low before, that one may see below their navels: this, with their beautiful faces always uncovered (contrary to the custom of most of the other provinces in

these parts), their good humour and lively freedom in conversation, altogether render them very attracting: notwithstanding which they have the reputation of being very chaste, though they seldom want opportunity; for according to the accounts of a late traveller, it is an established point of good manners among them, that as soon as any person comes in to speak to the wife, the husband goes out of the house: but whether this continency of theirs proceeds from their own generosity, to recompence their husbands for the confidence they put in them, or has its foundation only in fame, he pretends not to determine. Their language they have in common with the other neighbouring Tartars, although the chief people among them are also not ignorant of the Russian: their religion is Paganism; for notwithstanding they use circumcision among them, they have neither priest, alcoran, or mosque, like other Mahometans. Every body here offers his own sacrifice at pleasure; for which, however, they have certain days, established rather by custom than any positive command: their most solemn sacrifice is offered at the death of their nearest friends; upon which occasion both men and women meet in the field to be present at the offering, which is an he-goat; and having killed, they flay it, and stretch the skin with the head and horns on, upon a cross at the top of a long pole, placed commonly in a quickset hedge (to keep the cattle from it); and near the place the sacrifice is offered by boiling and roasting the flesh, which they afterwards eat. When the feast is over, the men rise, and having paid their adoration to the skin, and muttered over some certain prayers, the women withdraw, and the men conclude the ceremony with drinking a great quantity of aquavite; and this generally ends in a quarrel before they part. The face of the country is pleasantly diversified with mountains, valleys, woods, lakes, and rivers; and, though not much cultivated, is far from being unfruitful. In summer the inhabitants quit the towns, and encamp in the fields like the neighbouring Tartars; occasionally shifting their stations along with their flocks and herds. Besides game, in which the country greatly abounds, the Circassians eat beef and mutton; but that which they prefer to all others is the flesh of a young horse. Their bread consists of thin cakes of barley meal, baked upon the hearth, which they always eat new; and their usual drink is water or mare's milk; from the latter of which they distil a spirit, as most of the Tartar nations. They allot no fixed hours for the refreshments of the table or sleep, which they indulge irregularly, as inclination or convenience dictates. When the men make excursions into an enemy's country, they will pass several days and nights successively without sleeping; but, at their return, devote as much time to repose as the space in which they had before withheld from that gratification. When they eat, they sit cross-legged on the floor, the skin of some animal serving them instead of a carpet. In removing from one part of the country to another, the women and children are carried in waggons, which are a kind of travelling houses, and drawn by oxen or camels, they never using horses for draught. Their breed of the latter, however, is reckoned exceeding good; and they are accustomed to swim almost any river on horseback. The women and children smoke tobacco as well as the men; and this is the most acceptable

Circassia.

Circe
||
Circle.

table commodity which a traveller can carry with him into the Tartar countries. There are here no public inns, which indeed are unnecessary; for so great is the hospitality of the people, that they will contend with each other who shall entertain any stranger that happens to come among them.—The principal branch of their traffic is their own children, especially their daughters, whom they sell for the use of the seraglios in Turkey and Persia, where they frequently marry to great advantage, and make the fortune of their families. The merchants who come from Constantinople to purchase those girls are generally Jews, who, as well as the mothers, are said to be extremely careful of preserving the chastity of the young women, knowing the value that is set by the Turks upon the marks of virginity. The greater part of the Circassians are Christians of the Greek church; but there are also both Mahometans and Pagans amongst them.

CIRCE (fab. hist.), a daughter of Sol and Perseis, celebrated for her knowledge of magic and venomous herbs. She was sister to Æetes king of Colchis, and to Pasiphae the wife of Minos. She married a Sarmatian prince of Colchis, whom she murdered to obtain the kingdom. She was expelled by her subjects, and carried by her father upon the coasts of Italy in an island called *Æea*. Ulysses, at his return from the Trojan war, visited her coast; and all his companions, who ran headlong into pleasure and voluptuousness, were changed by Circe's potions into filthy swine. Ulysses, who was fortified against all enchantments by an herb called *moly*, which he had received from Mercury, went to Circe, and demanded sword and hand the restoration of his companions to their former state. She complied, and loaded the hero with pleasures and honours. In this voluptuous retreat Ulysses had by Circe one son called *Telegonus*, or two, according to Hesiod, called *Agrius* and *Latinus*. For one whole year Ulysses forgot his glory in Circe's arms. At his departure the nymph advised him to descend to hell and to consult the manes of Tiresias concerning the fates that attended him. Circe showed herself cruel to Scylla her rival, and to Picus.

CIRCENSIAN GAMES, a general term under which was comprehended all combats exhibited in the Roman circus, in imitation of the Olympic games in Greece. Most of the feasts of the Romans were accompanied with Circensian games; and the magistrates, and other officers of the republic, frequently presented the people with them, in order to procure their favour. The grand games were held five days, commencing on the 15th of September. See CIRCUS.

CIRCLE, in geometry, a plane figure comprehended by a single curve line, called its *circumference*, to which right lines drawn from a point in the middle, called the *centre*, are equal to each other. See GEOMETRY.

CIRCLES of the sphere, are such as cut the mundane sphere, and have their periphery either on its moveable surface, or in another immoveable, conterminous, and equidistant surface. See SPHERE.—Hence arise two kinds of circles, moveable and immoveable. The first, those whose peripheries are in the moveable surface, and which therefore revolve with its diurnal motion; as, the meridians, &c. The latter having their

periphery in the immoveable surface, do not revolve; as the ecliptic, equator, and its parallels, &c. See GEOGRAPHY.

CIRCLES of Altitude, otherwise called *almucantars*, are circles parallel to the horizon, having their common pole in the zenith, and still diminishing as they approach the zenith. See ALMUCANTAR.

Diurnal CIRCLES, are immoveable circles, supposed to be described by the seven stars, and other points of the heavens, in their diurnal rotation round the earth; or rather, in the rotation of the earth round its axis. The diurnal circles are all unequal: the equator is the biggest.

Horary CIRCLES, in dialing, are the lines which show the hours on dials; though these be not drawn circular, but nearly straight. See DIALING.

CIRCLES of Latitude, or *Secondaries of the Ecliptic*, are great circles parallel to the plane of the ecliptic, passing through the poles thereof, and through every star and planet. They are so called, because they serve to measure the latitude of the stars, which is nothing but an arch of one of these circles intercepted between the star and the ecliptic. See LATITUDE.

CIRCLES of Longitude, are several lesser circles, parallel to the ecliptic; still diminishing, in proportion as they recede from it. On the arches of these circles, the longitude of the stars is reckoned.

CIRCLE of perpetual Apparition, one of the lesser circles, parallel to the equator; described by any point of the sphere touching the northern point of the horizon; and carried about with the diurnal motion. All the stars included within this circle never set, but are ever visible above the horizon.

CIRCLE of perpetual Occultation, is another circle at a like distance from the equator; and contains all those stars which never appear in our hemisphere. The stars situated between these circles alternately rise and set at certain times.

Polar CIRCLES, are immoveable circles, parallel to the equator, and at a distance from the poles equal to the greatest declination of the ecliptic. That next the northern pole is called the ARCTIC; and that next to the southern one the ANTARCTIC.

Fairy-CIRCLE. See FAIRY-Circle.

Druidical CIRCLES, in British topography, a name given to certain ancient inclosures formed by rude stones circularly arranged, in the manner represented on Plate CXXXV†. These, it is now generally agreed, were temples, and many writers think also places of solemn assemblies for councils or elections, and seats of judgment. Mr Borlace is of this opinion. "Instead, therefore (says he), of detaining the reader with a dispute, whether they were places of worship or council, it may with great probability be asserted, that they were used for both purposes; and having for the most part been first dedicated to religion, naturally became afterwards the curiæ and foræ of the same community." These temples, though generally circular, occasionally differ as well in figure as magnitude: with relation to the first, the most simple were composed of one circle: Stonehenge consisted of two circles and two ovals, respectively concentric; whilst that at Botolph near St Just in Cornwall is formed by four intersecting circles. And the great temple at Avebury in Wiltshire,

Circles.

† In
Vol. IV.

Circle;
Circoncel-
liones.

Wiltshire, it is said, described the figure of a serpent or fiery flying serpent, represented by circles and right lines. Some besides circles have avenues of stone pillars. Most, if not all of them, have pillars or altars within their penetralia or centre. In the article of magnitude and number of stones, there is the greatest variety; some circles being only twelve feet diameter and formed only of twelve stones, whilst others, such as Stonehenge and Abury, contained, the first one hundred and forty, the second six hundred and fifty two, and occupied many acres of ground. All these different numbers and measures and arrangements had their pretended reference; either to the astronomical divisions of the year, or some mysteries of the druidical religion. Mr Borlase, however, supposes, that those very small circles, sometimes formed of a low bank of earth, sometimes of stones erect, and frequently of loose small stones thrown together in a circular form, enclosing an area of about three yards diameter, without any larger circle round them, were originally places of burial.

CIRCLE, in logic, or *Logical CIRCLE*, is when the same terms are proved *in orbem* by the same terms; and the parts of the syllogism alternately by each other, both directly and indirectly.

CIRCLES of the Empire, such provinces and principalities of the German empire as have a right to be present at diets. Maximilian I. divided the empire into six, and some years after into ten circles. This last division was confirmed by Charles V. The circles, as they stand in the Imperial Matricula, are as follow: Austria, Burgundy, the Lower Rhine, Bavaria, Upper Saxony, Franconia, Swabia, Upper Rhine, Westphalia, and the Lower Saxony.

CIRCONCELLIONES, a species of fanatics, so called because they were continually rambling round the houses in the country. They took their rise among the donatists in the reign of the emperor Constantine. It is incredible what ravages and cruelties these vagabonds committed in Africa through a long series of years. They were illiterate, savage peasants, who understood only the Punic language. Intoxicated with a barbarous zeal, they renounced agriculture, professed continence, and assumed the title of "Vindicators of justice, and Protectors of the oppressed." To accomplish their mission, they enfranchised slaves, scourged the roads, forced masters to alight from their chariots, and run before their slaves, whom they obliged to mount in their place; and discharged debtors, killing the creditors if they refused to cancel the bonds. But the chief objects of their cruelty were the catholics, and especially those who had renounced donatism. At first they used no swords, because God had forbidden the use of one to Peter; but they were armed with clubs, which they called the *clubs of Israel*; and which they handled in such a manner as to break a man's bones without killing him immediately, so that he languished a long time and then died. When they took away a man's life at once, they looked upon it as a favour. They became less scrupulous afterwards, and made use of all sorts of arms. Their shout was *Praise be to God*. These words in their mouths were the signal of slaughter, more terrible than the roaring of a lion. They had invented an unheard of punishment; which was to cover with lime diluted with vinegar,

the eyes of those unhappy wretches whom they had crushed with blows, and covered with wounds, and to abandon them in that condition. Never was a stronger proof what horrors superstition can beget in minds destitute of knowledge and humanity. These brutes, who had made a vow of chastity, gave themselves up to wine and all sorts of impurities, running about with women and young girls as drunk as themselves, whom they called *sacred virgins* and who often carried proofs of their incontinence. Their chiefs took the name of *Chiefs of the Saints*. After having glutted themselves with blood, they turned their rage upon themselves, and sought death with the same fury with which they gave it to others. Some scrambled up to the tops of rocks, and cast themselves down headlong in multitudes; others burned themselves, or threw themselves into the sea. Those who proposed to acquire the title of martyrs, published it long before; upon which they were feasted and fattened like oxen for the slaughter; after these preparations they set out to be destroyed. Sometimes they gave money to those whom they met, and threatened to murder them if they did not make them martyrs. Theodorat gives an account of a stout young man, who meeting with a troop of these fanatics, consented to kill them, provided he might bind them first; and having by this means put it out of their power to defend themselves, whipped them as long as he was able, and then left them tied in that manner. Their bishops pretended to blame them, but in reality made use of them to intimidate such as might be tempted to forsake their sect; they even honoured them as saints. They were not, however, able to govern those furious monsters; and more than once found themselves under a necessity of abandoning them, and even of imploring the assistance of the secular power against them. The counts Ursacius and Taurinus were employed to quell them; they destroyed a great number of them, of whom the donatists made as many martyrs. Ursacius, who was a good catholic and a religious man, having lost his life in an engagement with the barbarians, the donatists did not fail to triumph in his death, as an effect of the vengeance of heaven. Africa was the theatre of these bloody scenes during a great part of Constantine's life.

CIRCUIT, in law, signifies a longer course of proceedings than is needful to recover the thing sued for.

CIRCUIT, also signifies the journey or progress, which the judges take twice every year, through the several counties of England and Wales, to hold courts and administer justice, where recourse cannot be had to the king's courts at Westminster: hence England is divided into six circuits; viz. the Home circuit; Norfolk circuit; Midland circuit; Oxford circuit; Western circuit, and Northern circuit. In Wales there are but two circuits, North and South Wales: two judges are assigned by the king's commission to every circuit.

In Scotland, the judges of the supreme criminal court, or court of justiciary, are divided into three separate courts, consisting of two judges each; and the kingdom into as many districts. In certain boroughs of every district, each of these courts by rotation

Circoncel-
liones,
Circuit...

Circuit
||
Circulation.

tion are obliged to hold two courts in the year, in spring and autumn; which are called *circuit-courts*.

Electrical Circuit, denotes the course of the electric fluid from the charged surface of an electric body, to the opposite surface into which the discharge is made. Some of the first electricians apprehended, that the same particles of the electric fluid, which were thrown on one side of the charged glass, actually made the whole circuit of the intervening conductors, and arrived at the opposite side: whereas Dr Franklin's theory only requires, that the redundancy of electric matter on the charged surface should pass into the bodies which form that part of the circuit which is contiguous to it, driving forward that part of the fluid which they naturally possess; and that the deficiency of the exhausted surface should be supplied by the neighbouring conductors, which form the last part of the circuit. On this supposition, a vibrating motion is successively communicated through the whole length of the circuit. This circuit is always formed of the best conductors, let the length of it be ever so great. Many attempts were made, both in France and England, at an early period in the history of electricity, to ascertain the distance to which the electric shock might be carried, and the velocity of its motion. The French philosophers, at different times, made it to pass through a circuit of 900 toises, and of 2000 toises, or about two English miles and a half; and they discharged the Leyden phial through a basin of water, the surface of which was about an acre. And M. Mounier found, that, in passing through an iron wire of 950 toises in length, it did not spend a quarter of a second; and that its motion was instantaneous through a wire of 1319 feet. In 1747, Dr Watson, and other English philosophers, after many experiments of a similar kind, conveyed the electric matter through a circuit of four miles; and they concluded from this and another trial, that its velocity is instantaneous.

CIRCULAR, in a general sense, any thing that is described, or moved in a round, as the circumference of a circle, or surface of a globe.

Circular Numbers, called also *spherical ones*, according to some, are such whose powers terminate in the roots themselves. Thus, for instance, 5 and 6, all whose powers do end in 5 and 6, as the square of 5 is 25; the square of 6 is 36, &c.

Circular Sailing, is the method of sailing by the arch of a great circle. See **NAVIGATION**.

CIRCULATION, the act of moving round, or in a circle; thus we say, the circulation of the blood, &c.

Circulation of the Blood, the natural motion of the blood in a living animal, whereby that fluid is alternately carried from the heart into all parts of the body, by the arteries, from whence it is brought back to the heart again by the veins. See **ANATOMY**, n° 125.

In a foetus, the apparatus for the circulation of the blood is somewhat different from that in adults. The septum, which separates the two auricles of the heart, is pierced through with an aperture, called the *foramen ovale*; and the trunk of the pulmonary artery, a little after it has left the heart, sends out a tube into the descending aorta, called the *communicating canal*. The foetus being born, the foramen ovale closes by degrees, and the canal of communication dries up, and becomes a simple ligament.

As to the velocity of the circulating blood, and the time wherein the circulation is completed, several computations have been made. By Dr Keil's account, the blood is driven out of the heart into the aorta with a velocity which would carry it twenty-five feet in a minute: but this velocity is continually abated in the progress of the blood, in the numerous sections or branches of the arteries; so that before it arrive at the extremities of the body, its motion is greatly diminished. The space of time wherein the whole mass of blood ordinarily circulates, is variously determined. Some state it thus: Supposing the heart to make two thousand pulses in an hour, and that at every pulse there is expelled an ounce of blood; as the whole mass of blood is not ordinarily computed to exceed twenty-four pounds, it must be circulated seven or eight times over in the space of an hour.

The curious, in microscopic observations, have found an easy method of seeing the circulation of the blood in the bodies of animals: for these inquiries it is necessary to choose such animals as are small, and easily manageable, and which are either wholly or in part transparent. The observations made by this means are preferable to any others we can have recourse to; since, in dissections, the animal is in a state of pain, or dying; whereas in animals small enough to be thus viewed, all is left in its usual course, and we see what nature does in her own undisturbed method. In these creatures also, after viewing, as long as we please, the natural state and current of the blood, we may, by pressure, and several other ways, impede its course; and by putting various mixtures into the creature's water, induce a morbid state, and finally see the creature die, either by means of this or by any other method; and we may thus accurately observe all the changes it undergoes, and see what occasions the trembling pulse, &c. of dying people.

The current of the blood in small animals, that is, its passing on through the vessels, either to or from the heart, is very easily seen by the microscope; but its circulation, that is, its running to the extremities of the parts, and thence returning, is more difficult; because the vessels where this should be seen are so extremely minute, as not easily to come under observation. The larger arteries are easily distinguished from the veins by the motion of the blood through them, which in the veins is always smooth and regular; but in the arteries by several propulsions after the manner of pulsation. But this difference is not to be found in the more minute vessels; in all which, as well arteries as veins, the motion of the blood is even and regular.

The transparent membrane, or web between the toes of a frog's hinder foot, is a very proper object to observe the circulation of the blood in. The tails or fins of fishes are also very fine objects; and when the fish is very small, these are manageable, and afford a view of a great number of veins and arteries, with a very quick and beautiful succession of blood through them. The tail of a flounder may be very conveniently placed before the double microscope on a plate of glass; and its body being supported by something of equal height, the fish will lie still, and the circulation may be seen very agreeably. In the minutest vessels thus examined, the blood always appears pale

Circulation, pale or colourless, but in the large ones it is manifestly red. The arteries usually branch out extremely before they join the veins to carry the blood back to the heart: but this is not always the case; for Mr Lewenhoeck has observed, that on each side of the little gill-fles which give a stiffness to the tail of a flounder, there may be seen a very open communication of the veins and arteries; the blood running towards the extremities through arteries, and returning back again through veins, which were evidently a continuation of those arteries, and of the same diameter with them. The whole fish on the tail of which this examination was made, was not more than half an inch in length: it is easy to conceive, therefore, how small the tail must be; and yet in it there were 68 vessels which carried and returned the blood; and yet these vessels were far from being the most minute of all. How inconceivably numerous then must the *circulations* in the whole human body be? Mr Lewenhoeck is of opinion, that a thousand different circulations are continually carried on in every part of a man's body in the breadth of a finger nail.

The tail of a newt or water-lizard affords also a very entertaining prospect of the circulation of the blood through almost numberless small vessels; but no object shows it so agreeably as one of these animals while so young as not to be above an inch long; for then the whole body is so very transparent, that the circulation may be seen in every part of it, as well as in the tail; and, in these objects, nothing is more beautiful than the course of the blood into the toes and back again, where it may be traced all the way with great ease. Near the head there are also found three small fins which afford a very delightful prospect: these are all divided like the leaves of polypody; and in every one of the branches of these, the blood may be very accurately traced, running to the end through the artery, and there returning back again by a vein of the same size, and laid in the same direction; and as the vessels are very numerous and large in this part, and the third or fourth magnifier may be used, there are sometimes seen 30 or 40 channels of running blood at once; and this the more as the globules of blood in the newt are large, and are fewer in number, in proportion to the quantity of serum, than in any other animal: and their figure, as they are protruded through the vessels, changes in a very surprising manner. The impetus occasioning the circulation, is great enough in some animals to raise the blood six, seven, or eight feet high from the blood-vessel it springs out at; which, however, is far exceeded by that of the sap of a vine in bleeding time, which will sometimes rise forty feet high.

CIRCULATION of the sap of Plants. See PLANTS, and SAP.

CIRCULATION of the Spirits, or Nervous Fluid. See ANATOMY, no 136.

CIRCULATION, in chemistry, is an operation whereby the same vapour, raised by fire, falls back, to be returned and distilled several times.

CIRCULATION of Money. See COMMERCE, and MONEY.

Subterranean CIRCULATION. See SPRINGS.

CIRCULUS, in chemistry, an iron instrument in form of a ring, which being heated red-hot, and ap-

plied to the necks of retorts and other glass vessels till they grow hot, a few drops of cold water thrown upon them, or a cold blast, will make the necks fly regularly and evenly off.

Another method of doing this is, to tie a thread, first dipt in oil of turpentine, round the place where you would have it break; and then setting fire to the thread, and afterwards sprinkling the place with cold water, the glass will crack exactly where the thread was tied.

CIRCUMAMBIENT, an appellation given to a thing that surrounds another on all sides: chiefly used in speaking of the air.

CIRCUMCELLIONES. See CIRCONCELLIONES.

CIRCUMCISION, the act of cutting off the prepuce; a ceremony in the Jewish and Mahometan religions, wherein they cut off the foreskin of their males, who are to profess the one or the other law.

Circumcision commenced in the time of Abraham; and was, as it were, the seal of a covenant stipulated between God and him. It was in the year of the world 2178, that Abraham, by divine appointment, circumcised himself, and all the males of his family; from which time it became an hereditary practice among his descendants.

The ceremony, however, was not confined to the Jews: Herodotus and Philo Judæus observe, that it obtained also among the Egyptians and Ethiopians. Herodotus says, that the custom was very ancient among each people; so that there was no determining which of them borrowed it from the other. The same historian relates, that the inhabitants of Colchis also used circumcision; whence he concludes, that they were originally Egyptians. He adds, that the Phœnicians and Syrians were likewise circumcised; but that they borrowed the practice from the Egyptians. And lastly, that a little before the time when he wrote, circumcision had passed from Colchis to the people inhabiting near Thermoodon and Parthenius.

Marshall is of opinion, that the Hebrews borrowed circumcision from the Egyptians; and that God was not the first author thereof; citing Diodorus Siculus, and Herodotus, as evidences on his side. This latter proposition seems directly contrary to the testimony of Moses, who assures, Gen. xvii. that Abraham, though 99 years of age, was not circumcised till he had the express command of God for it. But as to the former position of Marshall, it will admit of more debate. The arguments on both sides may be seen in one view in *Spencer de Legibus Hebræorum*, l. 2. c. 4.

Be this as it will, it is certain the practice of circumcision among the Hebrews differed very considerably from that of the Egyptians. Among the first it was a ceremony of religion, and was performed on the eighth day after the birth of the child. Among the latter, a point of mere decency and cleanliness; and, as some will have it, of physical necessity; and was not performed till the 13th year, and then on girls as well as boys.

Among the Jews, the time for performing this rite was the eighth day, that is, six full days, after the child was born: the law of Moses ordained nothing with respect to the person by whom, the instrument with which, or the manner how, the ceremony was to be performed.

Circumambient
||
Circumcision.

Circumci-
tion
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Circumfe-
rentor.

ed; the instrument was generally a knife of stone. The child is usually circumcised at home, where the father, or godfather, holds him in his arms, while the operator takes hold of the prepuce with one hand, and with the other cuts it off; a third person holds a porringer, with sand in it, to catch the blood; then the operator applies his mouth to the part, and, having sucked the blood, spits it into a bowl of wine and throws a styptic powder upon the wound. This ceremony was usually accompanied with great rejoicings and feasting; and it was at this time that the child was named in presence of the company. The Jews invented several superstitious customs at this ceremony, such as placing three stools, one for the circumcisor, the second for the person who holds the child, and the third for Elijah, who, they say, assists invisibly at the ceremony, &c.

The Jews distinguished their proselytes into two sorts, according as they became circumcised or not: those who submitted to this rite were looked upon as children of Abraham, and obliged to keep the laws of Moses; the uncircumcised were only bound to observe the precepts of Noah, and were called *noachide*.

The Turks never circumcise till the seventh or eighth year, as having no notion of its being necessary to salvation. The Persians circumcise their boys at 13, and their girls from 9 to 15. Those of Madagascar cut the flesh at three several times; and the most zealous of the relations present, catches hold of the preputium and swallows it.

Circumcision is practised on women by cutting off the foreskin of the clitoris, which bears a near resemblance and analogy to the preputium of the male penis. We are told that the Egyptian captive-women were circumcised; and also the subjects of Prester John.

CIRCUMCISION is also the name of a feast, celebrated on the first of January, in commemoration of the circumcision of our Saviour.

CIRCUMDUCTION, in Scots law. When parties in a suit are allowed a proof of allegiances; after the time limited by the judge for taking that proof is elapsed, either party may apply for circumduction of the time of proving: the effect of which is, that no proof can afterwards be brought, and the cause must be determined as it stood when circumduction was obtained.

CIRCUMFERENCE, in a general sense, denotes the line or lines bounding a plane figure. However, it is generally used in a more limited sense, for the curve line which bounds a circle, and otherwise called a *periphery*; the boundary of a right-lined figure being expressed by the term *perimeter*.

CIRCUMFERENTOR, an instrument used by surveyors for taking angles.

Plate CXXXV. It consists of a brass index and circle, all of a piece. in Vol. IV. The index is commonly about 14 inches long, and an inch and a half broad; the diameter of the circle is about seven inches. On this circle is made a chart, whose meridian line answers to the middle of the breadth of the index, and is divided into 360 degrees. There is a brass ring soldered on the circumference of the circle, on which screws another ring, with a flat glass in it, so as to form a kind of box for the needle,

suspended on the pivot in the centre of the circle. There are also two sights to screw on, and slide up and down the index; as also a spangle and socket screwed on the back side of the circle for putting the head of the staff in.

How to observe the Quantity of an Angle by the Circumferentor. Let it be required to find the quantity of the angle EKG; first place your instrument at K, with the flower-de-luce of the chart towards you; then direct your sights to E, and observe what degrees are cut by the south end of the needle, which let be 296; then, turning the instrument about, direct your sights to G, noting then also what degrees are cut by the south end of the needle, which suppose 247. This done, always subtract the lesser from the greater, as in this example, 247 from 296, the remainder is 49 degrees, which is the true quantity of the angle EKG.

A circumferentor is made by Mr Jones of Holborn on an improved construction. From a very simple contrivance, it is rendered sufficient to take angles with the accuracy of a common theodolite; and by it angles of altitude and depression may be observed as readily as horizontal ones. The improvement chiefly consists in an arm or index (G), so applied to the centre of the compass box, and within it, that, at the time of observing, by only slipping a pin (p) out, the circle of degrees alone may move round, and leave the index (G) fixed. This index will remain stationary, from its being attached to the socket that screws on the head of the staffs. On the end of this index, next the degrees in the box, there is graduated a nonius scale, by which the circle of 360 degrees is subdivided into 5 minutes or less if desired. To take angles of altitude or depressions, the instrument is turned down on its ball and socket into a perpendicular position, and adjusted to its level by a plumb line (l); that is, hung on a pin at the back of the box, and made to coincide with a mark made thereon. Then by looking through the small sight holes (s) purposely made, the angles are shown on the circle of degrees by the nonius as before. The arms (AA) of the instrument slip off (at BB), and the whole packs into a case but 5½ inches square and 3 deep.

CIRCUMFLEX, in grammar, an accent, serving to note, or distinguish, a syllable of an intermediate sound between acute and grave; and generally somewhat long.—The Greeks had three accents, the acute, the grave, and the circumflex; formed thus, ´, ` , ~. In Latin, English, French, &c. the circumflex is made thus.—The acute raises the voice, and the grave falls or lowers it: the circumflex is a kind of undulation, or wavering of the voice, between the two. It is seldom used among the moderns, unless to show the omission of a letter which made the syllable long and open; a thing much more frequent in the French than among us: thus they write *pôte* for *paste*; *tête* for *teste*; *fâmes* for *fusmes*, &c. They also use the circumflex in the participles; some of their authors writing *connéu*, *peu*, others *connû*, *pû*, &c. Father Buffier is at a loss for the reason of the circumflex on this occasion.

The form of the Greek circumflex was anciently the same with that of ours, viz. ^; being a composition of the

Circumfe-
rentor,
Circumflex.

Ibid.

Ibid.

Circumgy-
ration
||
Circum-
vallation.

the other two accents $\wedge$ in one—But the copists, changing the form of the characters, and introducing the running-hand, changed also the form of the circumflex accent; and instead of making a just angle, rounded it off, adding a dash, through too much haste; and thus formed an $\smile$, laid horizontally, which produced this figure $\sim$, instead of this $\wedge$.

CIRCUMGYRATION, denotes the whirling motion of any body round a centre; such is that of the planets round the sun.

CIRCUMLOCUTION, an ambages, or tour of words, used either when a proper term is not at hand, to express a thing naturally and immediately by; or when one chooses not to do it, out of respect, or for some other reason. The word comes from *circumloquor*, "I speak about."

CIRCUMLOCUTION, in oratory, is the avoiding of something disagreeable or inconvenient to be expressed in direct terms; by intimating the sense thereof in a kind of paraphrase, so conceived as to soften or break the force thereof.

Thus Cicero, unable to deny that Clodius was slain by Milo, owns it, with this circumlocution, "Milo's servants being prevented from assisting their master, who was reported to be killed by Clodius; they, in his absence, and without his privity, or consent, did what every body would expect from their own servants on such an occasion."

CIRCUMPOLAR STARS, an appellation given to those stars, which, by reason of their vicinity to the pole, move round it without setting.

CIRCUMPOTATIO, in antiquity, a funeral feast provided in honour of the dead. This was very frequent among the ancient Romans, as well as among the Athenians. Solon at Athens, and the decemviri at Rome, endeavoured to reform this custom, thinking it absurd that mirth and drunkenness should mingle with sorrow and grief.

CIRCUMSCRIBED, in geometry, is said of a figure which is drawn round another figure, so that all its sides or planes touch the inscribed figure.

CIRCUMSCRIPTION, in natural philosophy, the termination, bounds, or limits, of any natural body.

CIRCUMSTANCE, a particularity, which, tho' not essential to any action, yet doth some way affect it.

CIRCUMSTANTIAL EVIDENCE, in law, or the doctrine of presumption, takes place next to positive proof: circumstances which either necessarily or usually attend facts of a particular nature, that cannot be demonstratively evinced, are called *presumptions*, and are only to be relied on till the contrary be actually proved.

CIRCUMSTANTIBUS, in law, a term used for supplying and making up the number of jurors (in case any impanelled appear not, or appearing are challenged by any party), by adding to them so many of the persons present as will make up the number, in case they are properly qualified.

CIRCUMVALLATION, or *Line of Circumvallation*, in the art of war, is a trench bordered with a parapet, thrown up quite round the besieger's camp, by way of security against any army that may attempt to relieve the place, as well as to prevent desertion.

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CIRCUMVOLUTION, in architecture, denotes the torus of the spiral line of the Ionic order.

CIRCUS, in antiquity, a large building, either round or oval, used for the exhibiting of shows to the people. Some derive the word from *Circe*, to whom Tertullian attributes the invention. Cassiodorus says, *Circus* comes à *circuitu*. The Romans, Servius observes, at first had no other circus but that made by the Tiber on one side, and a palisade of naked swords on the other. Hence, according to Isidore, came the term *ludi circenses*, *quasi circum enses*. But Scaliger ridicules that etymology.

The Roman circus was a large oblong edifice, arched at one end; encompassed with porticos, and furnished with rows of seats, placed ascending over each other. In the middle was a kind of foot-bank, or eminence, with obelisks, statues, and posts at each end. This served them for the courses of their *bigæ* and *quadrigæ*. There were no less than ten circuses at Rome: the largest was built by the elder Tarquin, called *Circus Maximus*, between the Aventine and Palatine mounts. It was so called, either because of its vast circumference, or because the great games were celebrated in it; or again, because it was consecrated to the great gods, viz, to Vertumnus, Neptune, Jupiter, Juno, Minerva, and the Dii Penates of Rome. Dionysius Halicarnassensis says that it was three stadia and a half in length, and four jugera broad; and these measures, according to Pliny, allowing to the Roman stadia 625 Roman feet, each of which is 12 inches, will give for the length 2187 Roman feet, or somewhat more than three English furlongs; and as to the breadth, allowing for each of the jugera 240 Roman feet, it will be 960 Roman feet. It was beautified and enlarged by the Roman emperors, so as to seat 250,000 spectators. The most magnificent circuses were those of Augustus and Nero. There are still some remains of the circuses at Rome, at Nismes, and other places. The Romans were excessively fond of the games exhibited in the circus: witness that verse in Juvenal,

Atque duas tantum res anxius optat,
Panem & circenses.

The Games of the *Circus*, which some call *Circensian Games*, were combats celebrated in the circus, in honour of Consus the god of councils; and thence also called *Consualia*. They were also called *Roman Games*, *Ludi Romani*, either on account of their antiquity, as being coeval with the Roman people, or because established by the Romans: and the games held there, the great games, *ludi magni*, because celebrated with more expence and magnificence than others; and because held in honour of the great god Neptune, who was their Consus.—Those who say they were instituted in honour of the sun, confound the *pompa circensis*, or procession of the circus, with the games.

The games of the circus were instituted by Evander, and re-established by Romulus: the pomp, or procession, was only a part of the games, making the prelude thereof, and consisting of a simple cavalcade of chariots. Till the time of the elder Tarquin, they were held in an island of the Tiber; and were called *Roman games*: after that prince had built the circus, they took their name therefrom; as being constantly held there. There were six kinds of exercises in the

D

circus:

Circumvo-
lution,
Circus.

Cirencester circus: the first was wrestling, and fighting with swords, with staves, and with pikes; the second was racing; the third, saltatio, dancing; the fourth, disci, quoits, arrows, and cestus: all which were on foot: the fifth was horse-courfing; the sixth, courses of chariots, whether with two horses or with four. In this last exercise, the combatants were at first divided into two squadrons or quadriis; then into four; each bearing the names of the colours they wore; *fatio alba, ruffea*, &c. At first there was only white and red; then green was added, and blue. Domitian added two more colours, but they did not continue. It was Oenomaus who first invented this method of distinguishing the quadriis by colours. The green was for those who represented the earth; the blue for the sea, &c.

CIRENCESTER, an ancient town of Gloucestershire in England. It was strongly fortified with walls and a castle in the time of the Romans. The ruins of the walls and street are, or were lately, to be seen in the adjacent meadows, where many Roman coins, chequered pavements, and inscriptions on marble, have been found. Two of the Roman consular ways cross each other at this town. The fosse-way, which comes from Scotland, passes through this county and town to Totness in Devonshire. The other, called *Irmin-street*, comes from Gloucester, and runs along to Southampton. Not many years ago they discovered, by digging in a meadow near the town, an ancient building under ground, 50 feet long, 40 broad, and 4 high, and supported by 100 brick pillars, curiously inlaid with stones of various colours, supposed to have been a Roman bath. Cirencester has now but one church, in the windows of which are the remains of very valuable painted glass. The town is governed by 2 high constables, and 14 wards-men, who govern 7 distinct wards; and it sends two members to parliament. It has a free school, a charity school, with several almshouses; and is seated on the river Churn, 36 miles north-east of Bristol, and 88 west by north of London. W. Long. 30. 1. N. Lat. 51. 42.

CIRENZA, a city of Naples, capital of the Basilicate, with an archbishop's see. It was formerly a considerable place, but is now of small consequence. It is seated on the river Brandano, at the foot of the Apennine mountains, in E. Long. 16. 44. N. Lat. 40. 48.

CIRO-FERRI, an excellent Italian painter and architect, was born at Rome in 1614, and was the disciple of Peter de Cortona, whose designs he imitated with such exactness, that it is difficult to distinguish them. He was esteemed by Pope Alexander VII. and his three successors, and died at Rome in 1689.

CIRRUS, or **CIRRHUS**, in botany, a clasper or tendril; that fine spiral string or fibre put out from the foot-stalks, by which some plants, as the ivy and vine, fasten themselves to walls, pales, or trees, for support. The term is synonymous to the capreolus, clavícula, and viticulus of other botanists: and is ranked by Linnæus among the fulcra, or parts of plants that serve for protection, support, and defence.

Tendrils are sometimes placed opposite to the leaves, as in the vine; sometimes at the side of the foot-stalk

of the leaf, as in passion-flower; and sometimes, as in winged pea, *pisum ochrus*, they are emitted from the leaves themselves. With respect to composition, they are either simple, that is, composed of one fibre or chord, as in the vetch; or compound, that is, consist of two, three, or more, as in the everlasting pea. Bitter sweet, solanum, dulcamara, bignonia, and ivy, send forth tendrils which plant themselves like roots in the adjacent walls, or the bark of the neighbouring trees. Claspers, says the ingenious Dr Grew, are like trunk-roots, a mean betwixt a root and a trunk, but a compound of both, as may be gathered from their circumvolutions, in which they mutually ascend and descend. In the mounting of the trunk, continues the same author, claspers serve for support. Thus, in vines, the branches being very long, fragile, and slender, would be liable to frequent breaking, unless, by means of their claspers, they were mutually contained together; so that the whole care is divided betwixt the gardener and nature: the former, with his ligaments of leather, secures the main branches; and nature, with those of her own providing, secures the less. Their aptitude to this end is seen in their convolutions, a motion not proper to any other part: and also in their toughness, which is so much the more remarkable, as they are slenderer than the branches from which they proceed. In the trailing of the trunk, tendrils serve for stabling and shade: thus, in cucumbers, the trunk and branches being long and fragile, would be driven to and fro by the winds, to the great prejudice both of themselves and their tender fruits, were they not, by these ligaments, held fast together, and preserved in association and good fellowship. The same claspers serve likewise for shade: so that a natural arbour is formed by the branches of the cucumber, in the same manner as an artificial one is made by tangling together the twigs of trees; for the branches, by the linking of their claspers, being couched together, the tender fruits lie under the umbrage of a bower made of their own leaves. Most of the pea-bloom flowers have twining claspers, that is, which wind to the right and back again.

CIRRI, in ichthyology, certain oblong and soft appendages, not unlike little worms, hanging from the under jaws or mouths of some fishes: these cirri, commonly translated *beards*, afford marks to distinguish the different species of the fishes on which they are found.

CIRTA, (anc. geog.) the metropolis and royal residence, not far from the river Ampsaga, in the inland parts of Numidia Propria. A colony, surnamed *Colonia Sittianorum*, very rich, when in the hands of Syphax. The colony was led by one P. Sittius, under the auspices of Cæsar, and was surnamed *Julia*. Now called *Constantina*, in Algiers. E. Long. 7. 0. Lat. 35. 30.

CISALPINE, any thing on this side the Alps. The Romans divided Gaul and the country now called *Lombardy*, into Cisalpine and Transalpine. That which was Cisalpine with regard to the Romans, is Transalpine with regard to us.

CISLEU, in Hebrew chronology, the ninth month of their ecclesiastical, and third of their civil, year, answering nearly to our November.

CISPADANAGALLIA, (anc. geog.), a district of Italy, to

Cirrus
||
Cispadana

Cissa to the south of the Po, occupied by the Gauls in the time of the kings of Rome, separated from Liguria on the west, as is thought by the Iria, running from south to north into the Po; bounded on the south by the Apennine, and on the east by the Adriatic. The term is formed analogically, there being much mention in Cicero, Tacitus, Suetonius, and ancient inscriptions, made of the *Transpadani*; which and *Cispadani* are terms used with respect to Rome. Ptolemy calls the *Cispadana* peculiarly *Gallia Togata*, extending between the Po and Apennine, to the Sapis and Rubicon.

CISSA, or **CISVUM** (anc. geog.), a town of the Hither Spain, in Lacetania, on the east side of the Iberus, (thought to be *Guiffona*). Where the Carthaginians were first defeated by Scipio. Another *Cissa* of Thrace, situated on the river *Ægos Potamus*, which Scylax seems to call *Cressa*, or *Crissa*; so that the reading is doubtful.

CISSAMPELOS, in botany: A genus of the monodelphia order, belonging to the diœcia class of plants; and in the natural method ranking under the 11th order, *Sarmentaceæ*. The male calyx is tetraphyllous; no corolla; the nectarium wheel-shaped; four stamens with their filaments grown together. The female calyx is monophyllous and ligulated roundish, or like a piece of garter a little roundish. There is no corolla; three styles, and a monospermous berry. There are two species, the *pareira* and *caapeba*, both natives of the warmest parts of America. The root of the second, applied externally, is said to be an antidote against the bites of venomous serpents. The plant being infused in water, quickly fills the liquor with a mucilaginous substance, which is as thick as jelly; whence the name of *freezing-wyth*, by which this genus of plants has been distinguished by the Brazilians.

CISSOID, in geometry, a curve of the second order, first invented by Diocles, whence it is called the *cissoïd of Diocles*. See **FLUXIONS**.

CISSUS, the **WILD-GRAPE**: A genus of the monogynia order, belonging to the tetrandria class of plants; and in the natural method ranking under the 46th order, *Hederaceæ*. The berry is monospermous, surrounded by the calyx, and a quadripartite corolla. There are four species, all of them natives of the island of Jamaica, and some of the other islands in the warm parts of America. They send out slender branches, having tendrils at their joints, by which they fasten to the neighbouring trees, bushes, and any other support, mounting to a considerable height. The fruit of some of the species are eaten by the negroes.

CISTERCIANS, in church-history, a religious order founded in the 11th century by St Robert, a Benedictine. They became so powerful, that they governed almost all Europe, both in spirituals and temporals. Cardinal de Vitri describing their observances, says, they neither wore skins nor shirts; nor ever eat flesh, except in sickness; and abstained from fish, eggs, milk, and cheese: they lay upon straw-beds, in tunics and cowls: they rose at midnight to prayers: they spent the day in labour, reading, and prayer: and in all their exercises observed a continual silence. The habit of the cistercian monks is a white robe,

in the nature of a cassock, with a black scapulary and hood, and is girt with a wooden girdle. The nuns wear a white tunic, and a black scapulary and girdle.

CISTERN, denotes a subterraneous reservoir of rain-water; or a vessel serving as a receptacle for rain or other water, for the necessary uses of a family. There are likewise lead-cisterns, jar-cisterns, &c.

Authors mention a cistern at Constantinople, the vaults of which are supported by two rows of pillars, 212 in each row, each pillar being two feet in diameter. They are planted circularly, and in *radii* tending to that of the centre.

Anciently there were cisterns all over the country in Palestine. There were some likewise in cities and private houses. As the cities for the most part were built on mountains, and the rains fell regularly in Judea at two seasons in the year only, in spring and autumn, people were obliged to keep water in cisterns in the country for the use of their cattle, and in cities for the convenience of the inhabitants. There are still cisterns of very large dimensions to be seen in Palestine, some whereof are 150 paces long, and 54 wide. There is one to be seen at Ramah of 32 paces in length, and 28 in breadth. Wells and cisterns, springs and fountains, are generally confounded in scripture-language.

CISTUS, the **ROCK-ROSE**: A genus of the monogynia order, belonging to the polyandria class of plants; and in the natural method ranking under the 20th order, *Rotaceæ*. The corolla is pentapetalous; the calyx pentaphyllous, with two of its leaves smaller than the rest. The seeds are contained in a capsule. There are 37 species, most of them natives of the southern parts of Europe, but hardy enough to bear the open air in this country. They are beautiful evergreen shrubs, generally very branchy quite from the bottom, and forming diffused heads. They are very ornamental in gardens, not only as evergreens, making a fine variety at all seasons with their leaves of different figures, sizes, and shades of green and white, but also as first-rate flowering shrubs, being very profuse in most elegant flowers of white, purple, and yellow colours. These flowers only last for one day; but there is a continual succession of new ones for a month or six weeks on the same plant; and when there are different species, they will exhibit a constant bloom for near three months. They are propagated either by seeds or cuttings, and thrive best in a dry soil. Their proper situation in shrubbery works should be towards the front of the clumps and other compartments, in assemblage with the choicest shrubs of similar growth, disposing them so as to make a variety, and to have shelter from the other plants; but they ought by no means to be crowded. Gum labdanum is found upon a species of *cistus* which grows naturally in the Levant, and is therefore called *ladanifera*. See **LABDANUM**.

CITADEL, a place fortified with five or six bastions, built on a convenient ground near a city, that it may command it in case of a rebellion.

CITADELLA, the capital town in the island of Minorca, in the Mediterranean, with a new harbour. This, with the whole island, were taken by General Stanhope and the confederate fleet in 1708, and ceded

Cistern
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Citadella

Citadinesca
Citium.

to Great Britain by the treaty of Utrecht in 1713: but it was taken by the French, after a brave defence, in 1756; and restored by the peace. In 1782, it was taken by the Spaniards, and confirmed to them at the subsequent peace. It is 27 miles west of Port-Mahon. E. Long. 3. 30. N. Lat. 39. 58.

CITADINESCA, in natural history, a name given by some writers to the Florentine marble, which is supposed to represent towns, palaces, ruins, rivers, &c. These delineations are merely accidental, and are commonly much assisted by the imagination, though the natural lines of a stone may sometimes luckily enough represent the ruins of some ancient building, or the course of a river. In England there is a kind of septaria, or ludus Helmontii, which has sometimes pretty beautiful, though very irregular, delineations of this kind. The Florentine marble, as we see it wrought up in the ornaments of cabinets, &c. owes a great deal to the skill of the workmen, who always pick out the proper pieces from the mass, and dispose them in the work so as to represent what they please.

CITATION, in ecclesiastical courts, is the same with summons in civil courts. See **SUMMONS**.

CITATION, is also a quotation of some law, authority, or passage of a book.

CITHÆRON (anc. geog.), a mountain and forest of Bœotia, celebrated both in fable and song. To the west it ran obliquely, a little above the Sinus Crissæus, taking its rise contiguous to the mountains of Megara and Attica; then levelled into plains, it terminates at Thebes, famous for the fate of Pentheus and Actæon; the former torn by the Bacchæ, the latter by his dogs; as also for the *orgia*, or revels of Bacchus.

CITHARA, in antiquity, a musical instrument, the precise structure of which is not known; some think it resembled the Greek delta Δ ; and others the shape of a half moon. At first it had only 3 strings, but the number was at different times increased to 8, to 9, and lastly to 24. It was used in entertainments and private houses, and played upon with a plectrum or quill, like the lyre.

CITHAREXYLON, FIDDLE-WOOD: A genus of the angiospermia order, belonging to the didynamia class of plants; and in the natural method ranking under the 40th order, *Personata*. The calyx is quinque-dentated, campanulated, wheel-shaped, and inclining to be funnel-shaped, with its segments villous on the upper side, equal. The fruit a dispermous berry: the seeds bilocular. There are two species, both natives of the warm parts of America, where they grow to be large trees, and are adorned with white flowers growing in spikes. In Britain they appear only as shrubs, and must be constantly retained in the stove, where they make a fine appearance, being beautiful evergreens. They may be propagated either by seeds or cuttings.

CITIUM, **CETIUM**, or *Cittium* (anc. geog.), a town of Cyprus, situated in the south of the island; famous for the birth of Zeno, author of the sect called *Stoics*; distant two hundred stadia to the west of Salamis (Diodorus Siculus). A colony of Phœnicians, called *Chetim*: And hence it is that not only Cyprus, but the other islands and many maritime places, are called *Chetim* by the Hebrews; now called *Chiti*.

CITIZEN, a native or inhabitant of a city, vested with the freedom and liberties of it.

A citizen of Rome was distinguished from a stranger, because he belonged to no certain commonwealth subject to the Romans. A citizen is either by birth or election; and sons may derive the right from their fathers. To make a good Roman citizen, it was necessary to be an inhabitant of Rome, to be inrolled in one of the tribes, and to be capable of dignities. Those to whom were granted the rights and privileges of Roman citizens, were only honorary citizens. It was not lawful to scourge a citizen of Rome.

CITRINUS, in natural history, the name of a peculiar species of sprig crystal, which is of a beautiful yellow. Many of the common crystals, when in the neighbourhood of lead mines, are liable to be accidentally tinged yellow, by an admixture of the particles of that metal; and all these, whether finer or coarser, have been too frequently confounded together under the name *citrine*: but Dr Hill has ascertained this to be a peculiar species of crystal different from all the others in form as well as in colour; and distinguished by the name of *ellipomacrostylum lucidum flavescens, pyramide brevis*. It is never found colourless like the other crystals, but has great variety of tinges, from that of the deeper ochres to a pale lemon-colour. It is very plentiful in the West Indies, and is sometimes found in Bohemia. Our jewellers have learned from the French and Italians, who are very fond of it, to call it *citrine*; and often cut stones for rings out of it, particularly out of the pyramid, which is always finer than the column; and these, after they have passed through two or three hands, are generally mistaken for topazes.

CITRON-TREE, in botany. See **CITRUS**.

CITRON-WATER, a well known strong water or cordial, which may be thus made: Take of fine thin lemon-peel, 18 ounces; of orange-peel, 9 ounces; perfect nutmegs, 4 ounces; the finest and best rectified spirit of wine, 2 gallons and a half. Digest in balneo mariæ for one night: draw off with a slow fire; then add as much water as will just make the matter milky (which will be about 7 quarts or 2 gallons); and lastly, add two pounds of fine sugar. This composition may be improved by fresh elder flowers, hung in a cloth in the head of the still, sprinkled with amber-grease in powder, or its essence.

CITRON-WOOD, the wood of an American tree, called by the natives *candle-wood*; because, being cut into splinters, it burns like a candle. The tree is frequent in the Leeward Islands, and grows to a considerable size: the leaves are like those of the bay-tree, but of a finer green; the flower is sweet, and much like those of the orange; the fruit succeeding these is black, and of the size of a pepper-corn. The trunk is so like the yellow saunders in colour, that there was once an opinion that it was the same tree, and much of it was imported into Europe, and sold as such: but they were soon found to be different; the saunders being of a sweet scent, and but moderately heavy and resinous; but the citron-wood considerably heavy, very oily, and of a strong smell. It is of no known use in medicine; but is used in France and Germany by the turners, being a fine firm-grained wood, and taking

Citizen
Citron.

Citrus. taking a fine polish, and with age becoming of a very beautiful brown.

CITRUS, the CITRON-TREE: A genus of the polyadelphia order, belonging to the icofandria class of plants. The calyx is quinquefid; the petals oblong, and five in number; the antheræ 20, with their filaments grown together so as to form various pencils. The fruit is an unilocular berry.

Species I. The Medica, or Citron-tree, hath an upright smooth trunk, divided at top into a branchy strong-shooting, full head, from about 5 to 15 feet high, adorned with large oval, spear-shaped, thick leaves, having linear foot-stalks, and numerous flowers from the sides of the branches, succeeded by very large oblong oval, pointed, rough-rinded fruit. The varieties are citron-tree with four-fruit; with sweet fruit; with long fruit; with warted fruit; with recurved fruit; and with blotched leaves.

II. The Lima, or Lemon-tree, hath an upright smooth trunk, divided upward into a branchy regular head; from 12 to 15 feet high; large, oval, spear-shaped, pointed, slightly sawed leaves, on linear foot-stalks: and many flowers from the sides of the branches succeeded by large oval fruit prominent at the top. The varieties are, the lemon-tree with four fruit; with sweetish fruit; with very large fruit called *Imperial lemon*; with spear-shaped fruit; with furrowed fruit; with clustered fruit; with childing fruit; with whitish fruit; with tricolor striped fruit; with silver striped leaves; and with double flowers.

III. The Aurantium, or Orange-tree, hath an upright trunk dividing upward into a branchy, regular head, from 5 to 10 or 12 feet high; oval, spear-shaped, entire leaves, having winged foot-stalks and numerous white flowers at the sides of the branches, succeeded by globular fruit compressed at both ends. The most noted varieties are, 1. The Seville orange. This is a very handsome tree, and the hardiest of any; as in this country it shoots freely, produces large and beautiful leaves, flowers stronger, &c. The fruit is large, rough, rinded, and sour, of excellent quality for æconomical uses. 2. The China orange. This tree has moderately sized leaves, and a smooth, thin-rinded, sweet fruit, of which there are several varieties in warm countries, where they grow in the open ground. 3. The great Shaddock orange, or pumplemoes, grows larger and stronger than the foregoing, with large, thick, and somewhat serrated leaves, and very large fruit, having a reddish pulp. It derives the name of Shaddock from one of that name that first brought it from the East Indies. 4. The Forbidden-fruit tree, in trunk, leaves, and flowers, very much resembles the common orange-tree; but the fruit, when ripe, is larger and longer than the biggest orange. It has somewhat the taste of a shaddock; but far exceeds that, as well as the best orange, in its delicious taste and flavour. 5. The Horned orange is a tree of moderate size, producing fruit which divide, and the rind runs out into divisions like horns. 6. The Hermaphrodite orange is a common sized tree, producing fruit shaped partly like an orange and partly like a citron. 7. The Dwarf orange tree, or nutmeg orange, has a long stem and small bushy head, growing two or three feet high; small oval leaves in clus-

ters; and numerous flowers in clusters, covering the branches, succeeded by very small fruit. These are the most remarkable varieties of the three foregoing species of citrus: but besides these there are a great number of others; and indeed in those countries where they grow naturally, the varieties may be multiplied without end, like those of our apples and pears. The flowers of all the species and varieties are formed each of five spreading petals, appearing here principally in May and June; and the fruit continue setting in June and July, and ripen the year following.

IV. The Trifoliata, or Japonese citron, is a thorny shrub growing naturally in Japan, where it is likewise known by the names of Gees, and Karatals banna. The trunk, we are told by Kæmpfer, acquires by age and culture the thickness of a tree. The branches and shoots are unequal; in some parts compressed, in others swelling, especially about the spines. These proceed singly from the stem and branches; are straight, run out from a broad base into a very sharp point; and are protruded from the wood, with the common bark of which they are likewise invested. The wood is loose and soft; the bark of a shining green, moist and easily parting from the wood. The leaves are few in number, sawed on the edges, veined, placed without order, but generally growing under the spines. They grow by threes, like those of trefoil, upon the extremity of a common footstalk which is furnished on each side with a membranaceous fringe or margin, somewhat resembling the pedicles of the orange. The upper surface of the leaves is of a bright lucid green, the lower dark and herbaceous. The flowers, which resemble those of the medlar, proceed singly from the arm-pits of the leaves; are white, possessed of no great degree of fragrance, and consist of five petals. The fruit is equally beautiful with a middle-sized orange; their internal structure is also pretty much the same; only the pulp is glutinous, of an unpleasant smell, and a harsh disagreeable taste. The seeds have the same taste with the pulp, and are shaped exactly like those of the orange.

Culture. The three first species merit particular attention. They are elegant evergreens, rising in this country from about 5 to 10 feet in height; forming full and handsome heads, closely garnished with beautiful large leaves all the year round, and putting forth a profusion of sweet flowers in spring and early in summer; which even in this climate are often succeeded by abundance of fruit that sometimes arrive at tolerable perfection. Though all the varieties were originally obtained by seed, yet the only certain method of continuing the approved varieties is by budding or inarching them on stocks raised from seed to a proper size. As the young trees, however, are brought in plenty from abroad, this method is seldom practised in this country: but for curiosity, it may be done by those who are so inclined, in the following manner: Early in the spring procure some kernels, which may be had in plenty from rotten fruits, or others that are properly ripened, observing that for stocks, the citron, lemon, and Seville orange, as being the freest shooters, are to be preferred; and of these the citron is the strongest. Sow the kernels in March, in pots of rich light earth half an inch deep, and plunge them in a hot-

Citrus.

Citrus. hot-bed under frames and glasses. Dung or tan may be used, but the latter is preferable; giving air, and frequent sprinklings of water. In two or three weeks, the plants will come up; and in six or eight weeks more, they will be advanced four or five inches or more in height. You must now give them more air and water; and about the middle of June harden them to the full air, in which let them remain till October; then move them into the green house, to stand till the spring, and in March or April plant them singly in small pots; being careful to shake them out of the seed pots with their roots entire. They must be watered immediately after planting, and the watering must be occasionally repeated. After this they are to be treated as woody exotics of the green-house; and in a year or two the largest of those designed for stocks will be fit for budding.

* See Inoculation.

The operation for budding is performed in the month of August, and is done in the common way*; only the buds must be taken from trees of a good kind that bear well. As soon as the operation is finished, the pots with their plants must be placed in the green-house, or in a glass-case; or, where there is the convenience of a spare bark-pit, where the heat of the bark is almost exhausted, the pots may be plunged therein for two or three weeks. In either case, however, the air must be admitted freely by opening the front glasses; allowing also a slight shade of mats in the middle of hot sunshine days, and supplying them with water every two or three days, during this kind of weather. In three or four weeks the buds will be united with the stock; when it will be proper to loosen the bandages, that they may have room to swell; the buds, however, will all remain dormant till the next spring. They may also be propagated by inarching, which is done in the common way†; but the method of budding is found to produce much handsomer trees, and therefore is to be preferred. But the most cheap and expeditious method of procuring a collection of these kinds of trees is by having recourse to such as are imported from Spain, Italy, and Portugal. These come over in chests, without any earth to their roots, having their roots and heads a little trimmed: they are commonly from one inch to two or three in diameter in the stem; from two to four or five feet in height; and by the assistance of a bark-bed they readily take root and grow freely; forming as good trees in two years, as could be raised here by inarching or budding in 15 or 20. They are sold in the Italian warehouses in London. Their price is from three shillings to a guinea each, according to their size; and they are generally advertised as soon as they arrive, which is early in the spring, and the sooner the better. In the choice of these trees, it must be observed, that they are commonly budded at such height in the stem, as to form heads from about two to four or five feet high; and as they are frequently furnished with two buds, one on each side of the stem, these should be chosen preferably to others; as they will form the most regular heads. Preparatory to their planting, they must be placed for a day or two in tubs of water to plump their bark and roots; after this they must be washed and cleaned, their branches trimmed to half a foot long, and the roots freed from diseased parts, and all the small

† See Inarching.

dried fibres. Then they are to be planted in pots filled with light rich earth; and plunged in a tan-bed, where they are to remain for three or four months; after which they are to be trained to the open air, but will not bear it longer than from the end of May till the middle or end of October.

Citrus.

Sometimes these trees, instead of being kept in pots or tubs, are planted in the full ground; and where this can be done, it is by far the most eligible method. Where this is intended, there must be frames erected for the support of glass and other covers, to defend the plants during inclement weather; and in this situation the trees generally shoot strong, produce large fruit, and may be trained either as wall or standard trees. A south wall, in a dry situation, is proper for training them as wall-trees; against which may be erected wooden frame-work sloping, either fixed or moveable, for the support of glass frames for winter; likewise for the greater protection of the trees in severe frosts, there may be a fire-place with a flue or two carried along a low wall in the fronts and ends. To have the trees as standards, a more capacious and lofty glass-case should be erected against the wall, in the manner of a hot-house, but higher; in this one or two rows of orange-trees may be planted, suffering them to run up as standards with only some necessary pruning just to preserve their regularity. In some places there are lofty moveable glass-cases, so that two or three rows of trees are planted in a conspicuous part of the pleasure-ground. In winter the frame is put over them, and in summer wholly taken away; so that they appear like a little orange-grove growing in the open ground. The flowering and fruit-setting season of all the sorts of citrus is in June and July. They are often, especially the orange-trees, greatly loaded with blossoms; and when these stand very thick, it is proper to thin them a little, taking off the smallest. It is also to be observed, that as the trees continue blowing and setting their fruit for three months, when a full crop of fruit is set, it is of benefit to the trees and fruit to gather off the superabundant blossoms as they are produced; though some permit them to remain on account of their appearance.

Uses. The fruits of the citron, lemon, and orange trees, yield very agreeable acid juices; which, besides the uses to which they are commonly applied, answer considerable purposes in medicine. When Commodore Anson sailed round the world, his men were so surprisingly recovered from the scurvy by the oranges which they found at the island of Tinian, that it was afterwards thought worthy of the attention of government to inquire into the virtues of these fruits as an antiscorbutic medicine. In Captain Cook's last voyage, he was supplied with a quantity of orange and lemon juice inspissated to a rob; but his opinion of its efficacy is by no means great. The dearth of it is a great objection; and, unless in conjunction with other things, he has not observed its good effects. Sir John Pringle, in his discourse before the Royal Society, when Captain Cook was presented with a medal by that respectable body, differs a little from the Captain's opinion, and thinks that in the sea-scurvy these fruits must necessarily be very efficacious. He approves, however, more of the

Citrus
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City.

the juices themselves depurated, than the extract of them; as this cannot be prepared without dissipating many of the finer parts. The juice of lemons is very frequently used for neutralising alkaline salts for saline draughts. The citron is seldom used in this country; though its peel, as well as that of the lemon, is candied, and sold as a sweetmeat. The yellow peel of the lemon is an agreeable aromatic, as is also that of the orange; and in cold phlegmatic constitutions they prove excellent stomachics and carminatives, promoting appetite, warming the habit, and strengthening the tone of the viscera. Orange-peel, however, is very considerably warmer than that of lemons, and abounds more in essential oil: to this circumstance, therefore, due regard ought to be had in the use of these medicines. The flavour of orange-peel is likewise less perishable than that of lemons. Both are ingredients in many officinal preparations.

The young fruit of the Seville orange dried are used in medicine under the name of *aurantia curaçavensis*. They are moderately warm bitterish aromatics of a sufficiently agreeable flavour. The flowers of the orange-tree have been for some time past in great esteem as a perfume. They are highly odoriferous, of a somewhat warm and bitter taste. They yield their flavour by infusion to rectified spirit, and in distillation both to spirit and water. The bitter matter is dissolved in water, and on evaporating the decoction remains entire in the extract. The distilled water was formerly kept in the shops, but on account of the great scarcity of the flowers is now laid aside; it is called by foreign writers *aqua naphæ*. An oil distilled from these flowers is brought from Italy under the name of *oleum, or essentia neroli*.

CITTERN, a musical instrument much resembling the guittar, for which it has been frequently mistaken. Anciently it was called the *cistrum*, and till lately was held in great contempt both in France and Britain. The practice on it being very easy, it was formerly the amusement and recreation of lewd women and their visitors; insomuch, that in many of the old English dramatic writers, it is made the symbol of a woman that lived by prostitution. It was also the common amusement of waiting customers in barbers shops, as being the most easy of all instruments to play on, and therefore it was thought that almost every body could make use of it.

CITY, according to Cowel, is a town corporate which hath a bishop and cathedral church; and is called *civitas, oppidum, and urbs*: *civitas*, in regard it is governed by justice and order of magistracy; *oppidum*, because it contains a great number of inhabitants; and *urbs*, because it is in due form surrounded with walls.

Kingdoms have been said to contain as many cities as they have seats of archbishops and bishops: but, according to Blount, *city* is a word that hath obtained since the conquest; for, in the time of the Saxons, there were no cities, but all the great towns were called *burghs*, and even London was then called *Londonburgh*, as the capital of Scotland is called *Edinburgh*. And long after the conquest the word *city* is used promiscuously with the *burgh*, as in the charter of Leicester, where it is both called *civitas* and *burgus*; which shows that those writers were mistaken who tell us

every city was, or is, a bishop's see. And though the word *city* signifies with us such a town corporate as hath usually a bishop and a cathedral church, yet it is not always so.

As to the ancient state of cities and villages, whilst the feudal policy prevailed, they held of some great lord on whom they depended for protection, and were subject to his arbitrary jurisdiction. The inhabitants were deprived of the natural and most unalienable rights of humanity. They could not dispose of the effects which their own industry had acquired, either by a latter-will or by any deed executed during their life. They had no right to appoint guardians for their children during their minority. They were not permitted to marry without purchasing the consent of the lord on whom they depended. If once they had commenced a law-suit, they durst not terminate it by an accommodation, because that would have deprived the lord, in whose court they pleaded, of the perquisites due to him on passing his sentence. Services of various kinds no less disgraceful than oppressive were exacted from them without mercy or moderation. The spirit of industry were checked in some cities by absurd regulations, and in others by unreasonable exactions; nor would the narrow and oppressive maxims of a military aristocracy have permitted it ever to rise to any degree of height or vigour.

The freedom of cities was first established in Italy, owing principally to the introduction of commerce. As soon as they began to turn their attention towards this object, and to conceive some idea of the advantages they might derive from it, they became impatient to shake off the yoke of their insolent lords, and to establish among themselves such a free and equal government as would render property secure and industry flourishing. The German emperors, especially those of the Franconian and Suabian lines, as the seat of their government was far distant from Italy, possessed a feeble and imperfect jurisdiction in that country. Their perpetual quarrels, either with the popes or their own turbulent vassals, diverted their attention from the interior police of Italy, and gave constant employment for their arms. These circumstances induced some of the Italian cities, towards the beginning of the 11th century, to assume new privileges; to unite together more closely; and to form themselves into bodies politic, under the government of laws established by common consent. The rights which many cities acquired by bold or fortunate usurpations, others purchased from the emperors, who deemed themselves gainers when they received large sums for immunities which they were no longer able to withhold; and some cities obtained them gratuitously from the facility or generosity of the princes on whom they depended. The great increase of wealth which the crusades brought into Italy, occasioned a new kind of fermentation and activity in the minds of the people, and excited such a general passion for liberty and independence, that, before the conclusion of the last crusade, all the considerable cities in that country had either purchased or had extorted large immunities from the emperors.

This innovation was not long known in Italy before it made its way into France. Louis the Gros, in order to create some power that might counterbalance those potent vassals who controlled or gave law to the

crowd.

City.

Robertson's
Charles V.

City.

crown, first adopted the plan of conferring new privileges on the towns situated within his own own domaine. These privileges were called *charters of community*, by which he enfranchised the inhabitants, abolished all marks of servitude, and formed them into corporations or bodies politic, to be governed by a council and magistrates of their own nomination. These magistrates had the right of administering justice within their own precincts; of levying taxes; of embodying and training to arms the militia of the town, which took the field when required by the sovereign, under the command of officers appointed by the community. The great barons imitated the example of their monarch, and granted like immunities to the towns within their territories. They had wasted such great sums in their expeditions to the Holy Land, that they were eager to lay hold on this new expedient for raising money by the sale of those charters of liberty. Though the constitution of communities was as repugnant to their maxims of policy as it was adverse to their power, they disregarded remote consequences in order to obtain present relief. In less than two centuries, servitude was abolished in most of the cities of France, and they became free corporations, instead of dependent villages without jurisdiction or privileges. Much about the same period the great cities of Germany began to acquire like immunities, and laid the foundations of the present liberty and independence. The practice spread quickly over Europe, and was adopted in Spain, England, Scotland, and all the other feudal kingdoms.

† See Lord
Lyttelton's
History of
Henry II.
Vol. II.
p. 317.

The Spanish historians are almost entirely silent concerning the origin and progress of communities in that kingdom; so that it is impossible to fix with any degree of certainty the time and manner of their first introduction there. It appears, however, from Mariana, that in the year 1350 eighteen cities had obtained a seat in the Cortes of Castile. In Arragon, cities seem early to have acquired extensive immunities, together with a share in the legislature. In the year 1118, the citizens of Saragossa had not only obtained political liberty, but they were declared to be of equal rank with the nobles of the second class; and many other immunities, unknown to persons in their rank of life in other parts of Europe, were conferred upon them. In England, the establishment of communities or corporations was posterior to the conquest. The practice was borrowed from France, and the privileges granted by the crown were perfectly similar to those above enumerated. It is not improbable, that some of the towns in England were formed into corporations under the Saxon kings; and that the charters granted by the kings of the Norman race were not charters of enfranchisement from a state of slavery, but a confirmation of privileges which they had already enjoyed †. The English cities, however, were very inconsiderable in the 12th century. A clear proof of this occurs in the history just referred to. Fitz-Stephen, a contemporary author, gives a description of the city of London in the reign of Henry II. and the terms in which he speaks of its trade, its wealth, and the number of its inhabitants, would suggest no inadequate idea of its state at present, when it is the greatest and most opulent city in Europe. But all ideas of grandeur and magnificence are merely comparative. It appears from Peter of Blois, archdeacon of London, who flourished in the same reign,

and who had good opportunity of being informed, that this city, of which Fitz-Stephen gives such a pompous account, contained no more than 40,000 inhabitants. The other cities were small in proportion, and in no condition to extort any extensive privileges. That the constitution of the boroughs of Scotland in many circumstances resembled that of the towns of France and England, is manifest from the *Leges Burgorum* annexed to the *Regiam Majestatem*.

CIVET, a kind of perfume which bears the name of the animal it is taken from, and to which it is peculiar. See VIVERRA.

Good civet is of a clear, yellowish, or brownish colour; not fluid nor hard, but about the consistence of butter or honey, and uniform throughout; of a very strong smell, quite offensive when undiluted, but agreeable when only a small portion of civet is mixed with a large one of other substances. It unites easily with oils both expressed and distilled, but not at all with water or spirit of wine: nor can it be rendered miscible with water by the mediation of sugar. The yolk of an egg seems to dispose it to unite with water; but in a very little while the civet separates from the liquor, and falls to the bottom, though it does not prove of such a resinous tenacity as when treated with sugar and spirit of wine. It communicates, however, some share of its smell both to watery and spirituous liquors: hence a small portion of it is often added in odoriferous tinctures, and suspended in the still-head during the distillation of odoriferous waters and spirits. It is rarely if ever employed for medicinal purposes. The Italians make it an ingredient in perfumed oils, and thus obtain the whole of its scent; for oils wholly dissolve the substance of it. It is very rare, however, to meet with civet unadulterated. The substances usually mixed with it are lard and butter; which agreeing with it in its general properties, render all criteria for distinguishing the adulteration impossible. A great trade of civet is carried on at Calicut, Bassora, and other parts of the Indies, and in Africa, where the animal that produces the perfume is found. Live civet-cats are to be seen also in France and Holland. The French keep them only as a rarity; but the Dutch, who keep a great number, draw the civet from them for sale. It is mostly used by confectioners and perfumers.

CIVET-Cat, the English name of the animal which produces the civet. See VIVERRA.

CIVIC CROWN, was a crown given by the ancient Romans to any soldier who had saved the life of a citizen in an engagement.

The civic crown was reckoned more honourable than any other crown, though composed of no better materials than oak-boughs. Plutarch, in the life of C. M. Coriolanus, accounts as follows for using on this occasion the branches of this tree before all others: because, says he, the oaken wreath being sacred to Jupiter, the great guardian of their city, they thought it the most proper ornament for him who had preserved the life of a citizen. Pliny*, speaking of the honour and privileges conferred on those who had merited this crown, says, "They who had once obtained it, might wear it always. When they appeared at the public spectacles, the senate and people rose to do them honour, and they took their seats on these occasions among the senators. They were not only per-

Civet,
Civic.Lib. xvi.
cap. 4.

Cividad
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Civil.

personally excused from all troublesome offices, but procured the same immunity for their father and grandfather by the father's side.

CIVIDAD-DE-LAS-PALMAS, the capital town of the island of Canary, with a bishop's see, and a good harbour. The houses are well built, two stories high, and flat-roofed. The cathedral is a very handsome structure; and the inhabitants are gay and rich. The air is temperate, and free from extremes of heat and cold. It is defended by a small castle seated on a hill. W. Long. 14. 35. N. Lat. 28. 0.

CIVIDAD-Real, a town of Spain, in New Castile, and capital of La Mancha. The inhabitants are noted for dressing leather extremely well for gloves. W. Long. 4. 15. N. Lat. 39. 2.

CIVIDAD-Roderigo, a strong and considerable town of Spain, in the kingdom of Leon, with a bishop's see. It is seated in a fertile country, on the river Aquada, in W. Long. 6. 52. N. Lat. 40. 38.

CIVIDAD-di-Friuli, a small but ancient town of Italy, in Friuli, and in the territory of Venice; seated on the river Natifona. E. Long. 13. 25. N. Lat. 46. 15.

CIVIL, in a general sense, something that regards the policy, public good, or peace, of the citizens or subjects of the state; in which sense we say, civil government, civil law, civil right, civil war, &c.

CIVIL, in a popular sense, is applied to a complaisant and humane behaviour in the ordinary intercourse of life. See **CIVILITY**.

CIVIL, in a legal sense, is also applied to the ordinary procedure in an action, relating to some pecuniary matter or interest; in which sense it is opposed to criminal.

CIVIL Death, any thing that cuts off a man from civil society; as a condemnation to the galleys, perpetual banishment, condemnation to death, outlawry, and excommunication.

CIVIL Law, is properly the peculiar law of each state, country, or city: but what we usually mean by the civil law, is a body of laws composed out of the best Roman and Grecian laws, compiled from the laws of nature and nations; and, for the most part, received and observed throughout all the Roman dominions for above 1200 years. See **LAW**, Part I. n° 43, 44.

It was first brought over into England by Theobald a Norman abbot, who was elected to the see of Canterbury in 1138; and he appointed a professor, viz. Roger surnamed *Vicarius*, in the university of Oxford, to teach it to the people of this country. Nevertheless it gained ground very slowly. King Stephen issued a proclamation, prohibiting the study of it. And though the clergy were attached to it, the laity rather wished to preserve the old constitution. However, the zeal and influence of the clergy prevailed; and the civil law acquired great reputation from the reign of King Stephen to the reign of King Edward III. both inclusive. Many transcripts of Justinian's Institutes are to be found in the writings of our ancient authors, particularly of Bracton and Fleta; and Judge Blackstone observes, that the common law would have been lost and over-run by the civil, had it not been for the incident of fixing the court of common pleas in one certain spot, and the forming the profession of the municipal law into an aggregate body.

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Civil
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Civility.

It is allowed that the civil law contains all the principles of natural equity; and that nothing can be better calculated to form good sense and sound judgment. Hence, though in several countries it has no other authority but that of reason and justice, it is every where referred to for authority. It is not received at this day in any nation without some alterations: and sometimes the feudal law is mixed with it, or general and particular customs; and often ordinances and statutes cut off a great part of it.

In Turkey, the Basilics are only used. In Italy, the canon law, and customs have excluded a good part of it. In Venice, custom hath almost an absolute government. In the Milanese, the feudal law, and particular customs, bear sway. In Naples and Sicily, the constitutions and laws of the Lombards are said to prevail. In Germany and Holland, the civil law is esteemed to be the municipal law: but yet many parts of it are there grown obsolete; and others are altered, either by the canon law or a different usage. In Friezeland, it is observed with more strictness; but in the northern parts of Germany, the *jus Saxonicum*, *Lubecense*, or *Culmense*, is preferred before it. In Denmark and Sweden, it hath scarce any authority at all. In France, only a part of it is received, and that part is in some places as a customary law; and in those provinces nearest to Italy it is received as a municipal written law. In criminal causes, the civil law is more regarded in France; but the manner of trial is regulated by ordinances and edicts. In Spain and Portugal, the civil law is connected with the *jus regium* and custom. In Scotland, the statutes of the *federunt*, part of the *regiæ majestatis*, and their customs, controul the civil law.

In England, it is used in the ecclesiastical courts, in the high court of admiralty, in the court of chivalry, in the two universities, and in the courts of equity; yet in all these it is restrained and directed by the common law.

CIVIL Society. See **LAW**, Part I. n° 12.

CIVIL State, in the British polity, one of the general divisions of the **LAITY**, comprehending all orders of men from the highest nobleman to the meanest peasant that are not included under the **MILITARY** or **MARITIME** states: though it may sometimes include individuals of these as well as of the **CLERGY**; since a nobleman, a knight, a gentleman, or a peasant, may become either a divine, a soldier, or a seaman. The division of this state is into **NOBILITY** and **COMMONALTY**. See these articles.

CIVIL War, a war between people of the same state, or the citizens of the same city.

CIVIL Year, is the legal year, or annual account of time, which every government appoints to be used within its own dominions; and is so called in contradistinction to the natural year, which is measured exactly by the revolution of the heavenly bodies.

CIVILIAN, in general, denotes something belonging to the civil law; but more especially the doctors and professors thereof are called *civilians*.

CIVILITY, a term used in common life as synonymous with complaisance or good-breeding.

Civility is justly inculcated by didactic writers as a duty of no slight consideration. Without civility, or good-breeding, a court would be the seat of violence and de-

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solation.

Civility.

solation. There, all the passions are in fermentation, because all pursue what but few can obtain; there, if enemies did not embrace, they would stab; there, smiles are often put on to conceal tears; there, mutual services are professed, while mutual injuries are intended; and there, the guile of the serpent simulates the gentleness of the dove. To what a degree must good-breeding adorn the beauty of truth, when it can thus soften the deformity of falsehood? On this subject we have the following elegant observations in Knox's Essays, N° 95.

"However just the complaints of the misery of life, yet great occasions for the display of beneficence and liberality do not often occur. But there is an hourly necessity for the little kind offices of mutual civility. At the same time that they give pleasure to others, they add to our own happiness and improvement. Habitual acts of kindness have a powerful effect in softening the heart. An intercourse with polished and humane company tends to improve the disposition, because it requires a conformity of manners. And it is certain, that a sense of decorum, and of a proper external behaviour, will restrain those whose natural temper would otherwise break out in acrimonious and petulant conversation. Even the affectation of philanthropy will in time contribute to realise it. The pleasure resulting from an act of kindness naturally excites a wish to repeat it; and indeed the general esteem which the character of benevolence procures, is sufficient to induce those to wish for it who act only from the mean motives of self-interest.

"As we are placed in a world where natural evil abounds, we ought to render it supportable to each other as far as human endeavours can avail. All that can add a sweet ingredient to the bitter cup must be infused. Amid the multitude of thorns, every flower that will grow must be cultivated with care. But neither pomp nor power are of themselves able to alleviate the load of life. The heart requires to be soothed by sympathy. A thousand little attentions from all around us are necessary to render our days agreeable. The appearance of neglect in any of those with whom we are connected, chills our bosom with chagrin, or kindles the fire of resentment. Nothing therefore seems so likely to ensure happiness as our mutual endeavours to promote it. Our single endeavours, originating and terminating in ourselves, are usually unsuccessful. Providence has taken care to secure that intercourse which is necessary to the existence of society, by rendering it the greatest sweetener of human life.

"By reciprocal attentions we are enabled to become beneficent without expence. A smile, and affable address, a look of approbation, are often capable of giving a greater pleasure than pecuniary benefits can bestow. The mere participation of the studies and amusements of others, at the same time that it gratifies ourselves, is often an act of real humanity; because others would not enjoy them without companions. A friendly visit in a solitary hour, is often a greater act of kindness than a valuable present.

"It is really matter of surprise, that those who are distinguished by rank and opulence should ever be unpopular in their neighbourhood. They must know the value of popularity; and surely nothing is more easily obtained by a superior. Their notice confers honour;

and the aspiring heart of man is always delighted with distinction. A gracious look from them diffuses happiness on the lower ranks. But it usually happens, that an overgrown rich man is not the favourite of a neighbouring country; and it is unfortunate, that pride or inadvertence often prevent men from acting the god-like part of making others happy, even when they might do it without inconvenience to themselves."

CIVITA-*di-PENNA*, an ancient town of Italy, in the kingdom of Naples, and in the Farther Abruzzo, with a bishop's see. It is situated near the river Salino, 25 miles north east of Aquila. E. Long. 13. 3. N. Lat. 42. 25.

CIVITA-*Castellana*, a town of Italy, in St Peter's patrimony, seated on a river, which, seven miles from thence, falls into the Tiber. E. Long. 13. 5. N. Lat. 42. 15.

CIVITA *Turchino*, a place in Italy, about two miles north of the town of Corneto in the patrimony of St Peter. It is an hill of an oblong form, the summit of which is almost one continued plain. From the quantity of medals, intaglios, fragments of inscriptions, &c. that are occasionally found here, this is believed to be the very spot where the ancient and powerful city of Tarquinii once stood. At present it is only one continued field of corn. On the south-east side of it runs the ridge of a hill which unites it to Corneto. This ridge is at least three or four miles in length, and almost entirely covered with artificial hillocks, called by the inhabitants *monti rossi*. About twelve of these hillocks have at different times been opened; and in every one of them have been found several subterranean apartments cut out of the solid rock. These apartments are of various forms and dimensions: some consist of a large outer room, and a small one within; others of a small room at the first entrance, and a large one within: others are supported by a column of the solid rock left in the centre, with openings on every part. The entrance to them all is by a door about five feet high, by two and a half broad. Some of them have no light but from the door, while others seem to have had a small light from above, through an hole of a pyramidal form. Many of these apartments have an elevated port that runs all round the wall, being a part of the rock left for that purpose. The moveables found in these apartments consist chiefly of Etruscan vases of various forms: in some indeed have been found some plain sacrophagi of stone, with bones in them. The whole of these apartments are stuccoed, and ornamented in various manners: some indeed are plain; but others, particularly three, are richly adorned, having a double row of Etruscan inscriptions running round the upper part of the walls, and under them a kind of frieze of figures in painting: some have an ornament under the figures, which seems to supply the place of an architrave. The paintings seem to be in fresco; and in general resemble those which are usually seen upon Etruscan vases; though some of them are perhaps superior to any thing as yet seen of the Etruscan art in painting. In general they are slight, but well conceived; and prove, that the artist was capable of producing things more studied and better finished; though, in such a subterraneous situation, the delicacy of a finished work would in a great measure have been thrown

Civita.

Civita thrown away. It is probable, however, that among the immense number of these apartments that yet remain to be opened, many paintings and inscriptions may be found sufficient to form a very useful and entertaining work. At present this great scene of antiquities is almost entirely unknown, even in Rome. Mr Jenkins, resident at Rome, was the first Englishman who visited it.

Claget.

CIVITA-Vecchia, a sea-port town of Italy in the patrimony of St Peter, with a good harbour, and an arsenal. Here the Pope's galleys are stationed, and it has lately been made a free port; but the air is very unwholesome. E. Long. 12. 31. N. Lat. 45. 5.

CIVOLI, or **CIGOLI**, (Lewis), an Italian painter, whose family-name was *Cardi*, was born at the castle of Cigoli, in Tuscany, in the year 1559. His *ecce homo*, which he performed as a trial of skill with Barocchio and Michael Angelo da Caravaggio, was judged better than those executed by them. He excelled in designing, and was employed by the popes and princes of his time. He died at Rome in 1613.

CIUS (anc. geog.) a town and river of Bithynia, which gave name to the Sinus Cianus. The town was afterwards called *Prusia*, Cius having been destroyed by Philip father of Perseus, and rebuilt by Prusias king of Bithynia. In the river, Hylas, the favourite boy of Hercules, was drowned; (Apollonius Rhodius).

CLAC, among countrymen. To clack wool, is to cut off the sheep's mark, which makes the weight less, and yields less custom to the king.

CLACKMANNAN, the name of a small shire in Scotland, not exceeding eight miles in length and five in breadth. It is bounded on the south by the frith of Forth; on the north and west by Perthshire; and on the east by Fife. The country is plain and fertile towards the frith, producing corn and pasture in abundance. It likewise yields great quantities of excellent coal, which is exported to England, France, and Holland. It is watered by the rivers Forth and Devan, and joins the shire of Kinross in sending a member alternately to parliament.

CLACKMANNAN, a small town of Scotland, and capital of the county of that name, is situated on the northern shore of the Forth, in W. Long. 3. 40. N. Lat. 56. 15. It stands on a hill, on the top of which is the castle, commanding a noble prospect. It was long the seat of the chief of the Bruces, who was hereditary sheriff of the county before the jurisdictions were abolished. The large square tower is called after the name of *Robert Bruce*; whose great sword and casque are still preserved here. The hill is prettily wooded; and, with the tower, forms a picturesque object. Clackmannan is still the seat of the Bruces of Kennet.

CLAGENFURT, a strong town of Germany, and capital of Carinthia, situated in E. Long. 13. 56. N. Lat. 46. 50.

CLAGET (William), an eminent and learned divine, born in 1646. He was preacher to the society of Gray's Inn; which employment he exercised until he died in 1688, being then also one of the king's chaplains. Archbishop Sharp gives him an excellent character; and bishop Burnet has ranked him among those worthy men whose lives and labours contributed to rescue the church from the reproaches which the follies of others had drawn upon it. Dr Claget pu-

blished several things; but his principal work is his "Discourse concerning the Operations of the Holy Spirit:" nor must it be forgotten that he was one of those excellent divines who made a noble stand against the designs of James II. to introduce popery. Four volumes of his sermons were published after his death by his brother Nicholas Claget, archdeacon of Sudbury, father of Nicholas Claget afterwards bishop of Exeter.

CLAIM, in law, a challenge of interest in any thing that is in the possession of another.

CLAIR, obscure. See *CLARO Obscuro*.

CLAIRAUT (ALEXIS), of the French academy of sciences, was one of the most illustrious mathematicians in Europe. He read to the academy in 1726, when he was not 13 years old, "a memoir upon four new geometrical curves of his own invention;" and supported the character he thus laid a foundation for by various publications from time to time. He published, *Elémens de Géométrie*, 1741, in 8vo; *Elémens d'Algebre*, 1746, in 8vo; *Théorie de la Figure de la Terre*, 1743, in 8vo; *Tables de la Lune*, 1754, in 8vo. He was concerned also in the *Journal des Sçavans*, which he furnished with many excellent extracts. He died in 1765. He was one of the academicians who were sent into the north to determine the figure of the earth.

CLAM, in zoology, a shell-fish. See *VENUS*.

CLAMP, a piece of wood joined to another.

CLAMP is likewise the term for a pile of unburnt bricks built up for burning. These clamps are built much after the same manner as arches are built in kilns, viz. with a vacuity betwixt each brick's breadth for the fire to ascend by; but with this difference, that instead of arching, they truss over, or over-span; that is, the end of one brick is laid about half way over the end of another, and so till both sides meet within half a brick's length, and then a binding brick at the top finishes the arch.

CLAMP in a ship, denotes a piece of timber applied to a mast or yard to prevent the wood from bursting; and also a thick plank lying fore and aft under the beams of the first orlop, or second deck, and is the same that the rising timbers are to the deck.

CLAMP-Nails, such nails as are used to fasten on clamps in the building or repairing of ships.

CLAMPETIA (anc. geog.), a town of the Brutii, one of those which revolted from Hannibal, (Livy); called *Lampetia* by Polybius. Now *Amantia*, or *Man-tia*, a town of Calabria Ultra, near the bay of Euphemia. E. Long. 16. 20. N. Lat. 39. 15.

CLAMPING, in joinery, is the fitting a piece of board with the grain to another piece of board cross the grain. Thus the ends of tables are commonly clamped, to prevent their warping.

CLANDESTINE, any thing done without the knowledge of the parties concerned, or without the proper solemnities. Thus a marriage is said to be clandestine, when performed without the publication of bans, the consent of parents, &c.

CLANS, in history, and particularly in that of Scotland. The nations which over-ran Europe were originally divided into many small tribes; and when they came to parcel out the lands which they had conquered, it was natural for every chieftain to bestow a portion,

Claim
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Clans.

Clans
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Clare.

Robertson's
History of
Scotland.

in the first place, upon those of his own tribe or family. These all held their lands of him; and as the safety of each individual depended on the general union, these small societies clung together, and were distinguished by some common appellation, either patronymical or local, long before the introduction of surnames or ensigns armorial. But when these became common, the descendants and relations of every chieftain assumed the same name and arms with him: other vassals were proud to imitate their example; and by degrees they were communicated to all those who held of the same superior. Thus clanships were formed; and, in a generation or two, that consanguinity, which was at first in a great measure imaginary, was believed to be real. An artificial union was converted into a natural one: men willingly followed a leader, whom they regarded both as the superior of their lands and the chief of their blood; and served him not only with the fidelity of vassals, but the affection of friends. In the other feudal kingdoms, we may observe such unions as we have described, imperfectly formed; but in Scotland, whether they were the production of chance, or the effect of policy, or strengthened by their preserving their genealogies both genuine and fabulous, clanships were universal. Such a confederacy might be overcome; it could not be broken; and no change of manners or government has been able, in some parts of the kingdom, to dissolve associations which are founded upon prejudices so natural to the human mind. How formidable were nobles at the head of followers, who, counting that cause just and honourable which their chief approved, were ever ready to take the field at his command, and to sacrifice their lives in defence of his person or of his fame! Against such men a king contended with great disadvantage; and that cold service, which money purchases, or authority extorts, was not an equal match for their ardour and zeal.

Some imagine the word *clan* to be only a corruption of the Roman *colonia*; but Mr Whittaker asserts it to be purely British, and to signify a *family*.

CLAP, in medicine, the first stage of the venereal disease, more usually called a GONORRHOEA.

CLAP-Net, in birding, a sort of net contrived for the taking of larks with the looking-glass, by the method called *daring* or *doring*. The nets are spread over an even piece of ground, and the larks are invited to the place by other larks fastened down, and by a looking-glass composed of five pieces, and fixed in a frame so that it is turned round very swiftly backwards and forwards, by a means of a cord pulled by a person at a considerable distance behind a hedge. See DORING.

CLAR, or CLAER, in metallurgy, bone-ashes perfectly calcined, and finely powdered, kept purposely for covering the insides of COPPERS.

CLARAMONT-POWDER, a kind of earth, called *terra de Baira*, from the place where it is found; it is famous at Venice, for its efficacy in stopping hemorrhages of all kinds, and in curing malignant fevers.

PRECEPT of CLARE CONSTAT, in Scots law, the warrant of a superior for entering and infesting the heir of his former vassal, without the interposition of an inquest.

Nuns of St CLARE, were founded at Assisa in Italy,

about the 1212. These nuns observed the rule of St Francis, and wore habits of the same colour with those of the Franciscan friars: and hence were called *Meneresses*; and their house, without Aldgate, the Minories, where they were settled when first brought over into England, about the year 1293. They had only three houses besides this.

CLARE, a market-town of Suffolk, 13 miles south of Bury. E. Long. 0. 35. N. Lat. 52. 15. It gives the title of Earl to the duke of Newcastle.

CLARE is also the capital of a county of the same name in the province of Connaught, in Ireland, situated about 17 miles north-west of Limerick. W. Long. 9. 0. N. Lat. 52. 40.

CLARENCIEUX, the second king at arms, so called from the duke of Clarence, to whom he first belonged: for Lionel, 3d son to Edward III. having by his wife the honour of Clare in the county of Thomond, was afterwards declared duke of Clarence; which dukedom afterwards escheating to Edward IV. he made this earl a king at arms. His office is to marshal and dispose of the funerals of all the lower nobility, as baronets, knights, esquires, on the south side of the Trent; whence he is sometimes called *surroy* or *south-roy*, in contradistinction to *norroy*.

CLARENDON (Constitutions of), certain constitutions made in the reign of Henry II. A. D. 1164. in a parliament held at Clarendon; whereby the king checked the power of the pope and his clergy, and greatly narrowed the total exemption they claimed from secular jurisdiction.

CLARENDON (Earl of) See HYDE.

CLARENNA, Tabulae (anc. geog.); a town of Vindelicis, at the confluence of the Lycus and Danube. Now Rain, a town of Bavaria, on the south side of the Danube, at the confluence of the Lech. E. Long. 11. 0. N. Lat. 48. 45.

CLARENZA, the capital of a duchy of the same name in the Morea; it is a sea-port town, situated on the Mediterranean. E. Long. 21. 40. N. Lat. 37. 40.

CLARET, a name given by the French to such of their red wines as are not of a deep or high colour. See WINE.

CLARICHORD, or MANICHORD, a musical instrument in form of a spinet.

It has 49 or 50 stops, and 70 strings, which bear on five bridges; the first whereof is the highest, the rest diminishing in proportion. Some of the strings are in unison, their number being greater than that of the stops. There are several little mortises for passing the jacks, armed with brass-hooks, which stop and raise the chords instead of the feather used in virginals and spinets: but what distinguishes it most is, that the chords are covered with pieces of cloth, which render the sound sweeter, and deaden it so that it cannot be heard at any considerable distance: whence it comes to be particularly in use among the nuns, who learn to play, and are unwilling to disturb the silence of the dormitory.

CLARIFICATION, the act of cleaning or fining any fluid from all heterogeneous matter or feculencies.

The substances usually employed for clarifying liquors, are whites of eggs, blood, and isinglass. The two first are used for such liquors as are clarified whilst boiling

Clare
||
Clarification.

Clarigatio
Clariffes.

boiling hot; the laſt for thoſe which are clarified in the cold, ſuch as wines, &c. The whites of eggs are beat up into a froth, and mixed with the liquor, upon which they unite with and entangle the impure matters that floated in it; and preſently growing hard by the heat, carry them up to the ſurface in form of a ſcum no longer diſſoluble in the liquid. Blood operates in the ſame manner, and is chiefly uſed in purifying the brine from which ſalt is made. Great quantities of iſinglaſs are conſumed for fining turbid wines. For this purpoſe ſome throw an entire piece, about a quarter of an ounce, into a wine caſk; by degrees the glue diſſolves, and forms a ſkin upon the ſurface, which at length ſubſiding, carries down with it the ſeculent matter which floated in the wine. Others preſently diſſolve the iſinglaſs; and having boiled it down to a ſlimy conſiſtence, mix it with the liquor, roll the caſk ſtrongly about, and then ſuffer it to ſtand to ſettle. Neumann queſtions the wholeſomeness of wines thus purified; and aſſures us that he himſelf, after drinking only a few ounces of ſack thus clarified, but not ſettled quite fine, was ſeized with ſickneſs and vomiting, followed by ſuch a vertigo, that he could not ſtand upright for a minute together. The giddineſs continued with a nauſea and want of appetite for ſeveral days.

CLARIGATIO, in Roman antiquity, a ceremony that always preceded a formal declaration of war. It was performed in this manner: firſt four heralds crowned with vervain, were ſent to demand ſatisfaction for the injuries done the Roman ſtate. Theſe heralds taking the gods to witneſs that their demands were juſt, one of them, with a clear voice, demanded reſtitution within a limited time, commonly 33 days; which being expired without reſtitution made, then the *pater patratus*, or prince of the heralds, proceeded to the enemies frontiers, and declared war.

CLARII APOLLINIS FANUM (Strabo, Pliny), a temple and grove of Apollo, ſituated between Colophon and Lebedos, in Ionia: called *Claros* (Thucydides, Ovid). The name alſo of a town and mountain there (Nicander); and of a fountain (Clemens Alexandrinus): the waters of which inſpired with prophetic fury. *Clarins* the epithet of Apollo (Strabo).

CLARION, a kind of trumpet, whoſe tube is narrower and its tone acuter and ſhriller than that of the common trumpet. It is ſaid that the clarion, now uſed among the Moors and Portuguese, who borrowed it from the Moors, ſerved anciently for a treble to ſeveral trumpets, which ſounded tenor and baſs.

CLARISSES, an order of nuns ſo called from their founder St Clara or St Clare. (See CLARE). She was in the town of Affiſa in Italy; and having renounced the world to dedicate herſelf to religion, gave birth to this order in the year 1212; which comprehends not only thoſe nuns that follow the rule of St Francis, according to the ſtrict letter, and without any mitigation, but thoſe likewiſe who follow the ſame rule ſoftened and mitigated by ſeveral popes. It is at preſent one of the moſt flouriſhing orders of nuns in Europe. After Ferdinand Cortex had conquered Mexico for the king of Spain, Iſabella of Portugal, wife of the emperor Charles V. ſent thither ſome nuns of the order of St Clara, who made ſeveral ſettlements

there. Near their monaſteries were founded communities of Indian young women, to be inſtructed by the clariffes in religion, and ſuch works as were ſuitable to perſons of their ſex. Theſe communities are ſo conſiderable that they uſually conſiſt of four or five hundred.

Clarke.

CLARKE (Dr Samuel), a preacher and writer of conſiderable note in the reign of Charles II. was during the inter regnum, and at the time of the ejection, miniſter of St Bennet Fink in London. In November 1660, he, in the name of the Presbyterian miniſters, preſented an addreſs of thanks to the king for his declaration of liberty of conſcience. He was one of the commiſſioners of the Savoy; and behaved on that occaſion with great prudence and moderation. He ſometimes attended the church as an hearer and communicant; and was much eſteemed by all that knew him, for his great probity and induſtry. The moſt valuable of his numerous works are ſaid to be his *Lives of the Puritan Divines* and other perſons of note, 22 of which are printed in his martyrology: the reſt are in his *Lives of ſundry Eminent Perſons in this latter Age*, folio; and in his *Marrow of Eccleſiaſtical Hiſtory*, in folio and quarto. He died in 1680.

CLARKE (Samuel), the ſon of the former, was fellow of Pembroke-hall in Cambridge; but was ejected from his fellowſhip for reſuſing to take the engagements, as he was alſo afterwards from his rectory of Grendon in Buckinghamſhire. He applied himſelf early to the ſtudy of the ſcriptures; and his annotations on the Bible, printed together with the ſacred text, is highly commended by Dr Owen. Mr Baxter, and Dr Calamy. He died in 1701, aged 75.

CLARKE (Dr Samuel), a very celebrated Engliſh divine, was the ſon of Edward Clarke, Eſq; alderman of Norwich, and one of its representatives in parliament for ſeveral years; and born there October 11. 1675. He was inſtructed in claſſical learning at the free ſchool of that town; and in 1691 removed thence to Caius college in Cambridge, where his uncommon abilities ſoon began to diſplay themſelves. Though the philoſophy of Des Cartes was at that time the eſta bliſhed philoſophy of the univerſity, yet Clarke eaſily maſtered the new ſyſtem of Newton; and in order to his firſt degree of arts, performed a public exerciſe in the ſchools upon a queſtion taken from it. He greatly contributed to the eſta bliſhment of the Newtonian philoſophy by an excellent tranſlation of, and notes upon, Rohault's "*Phyſics*," which he finiſhed before he was 22 years of age. The ſyſtem of natural philoſophy then generally taught in the univerſity was that written by Rohault, founded altogether upon Cartesian principles, and very ill tranſlated into Latin. Clarke gave a new tranſlation, and added to it ſuch notes as might lead ſtudents inſenſibly and by degrees to other and truer notions than could be found there. "And this certainly (ſays Biſhop Hoadly) was a more prudent method of introducing truth unknown before, than to attempt to throw aſide this treatiſe entirely, and write a new one inſtead of it. The ſucceſs answered exceedingly well to his hopes; and he may juſtly be ſtyled a great benefactor to the univerſity in this attempt. For by this means the true philoſophy has, without any noiſe, prevailed: and to this day his tranſlation of Rohault is, generally ſpeak-
ing,

Clarke. ing, the standing text for lectures, and his notes the first direction to those who are willing to receive the reality and truth of things in the place of invention and romance." Whiston relates, that in 1697, while he was chaplain to Moore bishop of Norwich, he met young Clarke, then wholly unknown to him, at a coffeehouse in that city; where they entered into a conversation about the Cartesian philosophy, particularly Rohault's "Physics," which Clarke's tutor, as he tells us, had put him upon translating. "The result of this conversation was (says Whiston), that I was greatly surprized that so young a man as Clarke then was, should know so much of those sublime discoveries, which were then almost a secret to all, but to a few particular mathematicians. Nor did I remember (continues he) above one or two at the most, whom I had then met with, that seemed to know so much of that philosophy as Clarke." This translation of Rohault was first printed in 1697, 8vo. There have been four editions of it, in every one of which improvements have been made; especially in the last in 1718, which has the following title: *Jacobi Rohaulti Physica. Latine vertit, recensuit, et uberioribus jam Annotationibus, ex illustrissimi Isaaci Newtoni Philosophia maximam partem hausit, amplificavit et ornavit S. Clarke, S. T. P. Accedunt etiam in hac quarta editione novae aliquot tabulae aeri incisae, et Annotationes multum sunt auctae.* Dr John Clarke, late dean of Sarum, and our author's brother, translated this work into English, and published it in 2 vols 8vo.

Afterwards he turned his thoughts to divinity: and in order to fit himself for the sacred function, he studied the Old Testament in the original Hebrew, the New in the original Greek, and the primitive Christian writers. Having taken holy orders, he became chaplain to Moore bishop of Norwich, who was ever after his constant friend and patron. In 1699 he published two treatises: one intitled "Three practical Essays on Baptism, Confirmation, and Repentance;" the other, "Some Reflections on that part of a book called Amyntor, or a Defence of Milton's Life, which relates to the Writings of the Primitive Fathers, and the Canon of the New Testament." In 1701 he published "A Paraphrase upon the Gospel of St Matthew;" which was followed in 1702 by the "Paraphrases upon the Gospels of St Mark and St Luke," and soon after by a third volume "upon St John." They were afterwards printed together in 2 vols 8vo; and have since undergone several editions. He intended to have gone through the remaining books of the New Testament, but something accidentally interrupted the execution.

Mean while Bishop Moore gave him the rectory of Drayton near Norwich, and procured for him a parish in that city; and these he served himself in that season when the Bishop resided at Norwich. In 1704 he was appointed to preach Boyle's lecture; and the subject he chose was, "The being and attributes of God." He succeeded so well in this, and gave such high satisfaction, that he was appointed to preach the same lecture the next year; when he chose for his subject "The evidences of natural and revealed religion." These sermons were first printed in two distinct volumes; the former in 1705, the latter in 1706. They have since been printed in one volume, under the ge-

neral title of "A Discourse concerning the Being and Attributes of God, the Obligations of natural Religion, and the Truth and Certainty of the Christian Revelation, in answer to Hobbes, Spinoza, the Author of the Oracles of Reason, and other Deniers of natural and revealed Religion." Clarke having endeavoured in the first part of this work to show, that the being of a God may be demonstrated by arguments *à priori*, is unluckily involved in the censure which Pope has passed upon this method of reasoning in the following lines. They are put into the mouth of one of his dunces, addressing himself to the goddesses Dunces:

"Let others creep by timid steps and slow,
"On plain experience lay foundations low,
"By common sense to common knowledge bred,
"And lost to nature's cause through nature led,
"All-seeing in thy mists, we want no guide,
"Mother of arrogance, and source of pride!
"We nobly take the high priori road,
"And reason downward, till we doubt of God!"

Dunciad, b. 4. l. 455.

Upon which we have the following note: "Those who, from the effects in this visible world, deduce the eternal power and Godhead of the first cause, though they cannot attain to an adequate idea of the Deity, yet discover so much of him, as enables them to see the end of their creation and the means of their happiness: whereas they who take this high priori road, as Hobbes, Spinoza, Des Cartes, and some better reasoners, for one that goes right, ten lose themselves in mists, or ramble after visions, which deprive them of all sight of their end, and mislead them in the choice of wrong means." Clarke, it is probable, would not have denied this; and the poet perhaps would have spared his better reasoners, and not have joined them with such company, had he recollected our author's apology for using the argument *à priori*. "The argument *à posteriori* (says he) is indeed by far the most generally useful argument, most easy to be understood, and in some degree suited to all capacities; and therefore it ought always to be insisted upon: But for as much as atheistical writers have sometimes opposed the being and attributes of God by such metaphysical reasonings, as can no otherwise be obviated than by arguing *à priori*; therefore this manner of arguing also is useful and necessary in its proper place." To this may be added the answer he made to Mr Whiston upon this occasion, as narrated by the latter in his Historical Memoirs. "When Clarke brought me his book, I was in my garden against St Peter's college in Cambridge, where I then lived. Now I perceived, that in these sermons he had dealt a great deal in abstract and metaphysical reasoning. I therefore asked him how he ventured into such subtleties which I never durst meddle with? and showing him a nettle, or some contemptible weed in my garden, I told him that weed contained better arguments for the being and attributes of a God than all his metaphysics. Clarke confessed it to be so; but alleged for himself, that since such philosophers as Hobbes and Spinoza had made use of those kind of subtleties against, he thought proper to show that the like way of reasoning might be made better use of on the side of, religion: which reason or excuse I allowed to be not inconsiderable." Undoubtedly, as the present editor of Biographia Britannica ob-

serves,

Clarke. serves, the grand, the proper, the decisive proof of the existence, perfections, and providence of the Deity, must be drawn from his works. On this proof, as being equally satisfactory to the profoundest philosopher and the meanest peasant, the cause of religion will ever stand secure. Nevertheless, if there be such a thing as an argument *à priori*, why may not speculative men be employed in its examination? Several able divines and philosophers have thought, and still think, that this argument for the being and attributes of God, will stand the test of the severest scrutiny; and therefore they cannot be blamed for endeavouring to set it in a convincing light to others. As to the merit, indeed, of the whole work under consideration, including the evidences of natural and revealed religion, it is undoubtedly of the first order. Difficulties may be raised on particular points, and the ablest and most candid inquirers may sometimes see cause to hesitate with regard to the validity of the reasoning: but still, in general, the book reflects honour on the age as well as the author that produced it, and will descend, with distinguished reputation, to a late posterity. The defence, in particular, of the sacred original and authority of Christianity, is admirably conducted.

In 1706 he published "A Letter to Mr Dodwell;" wherein all the arguments in his epistolary discourse against the immortality of the soul are particularly answered, and the judgment of the fathers, to whom Mr Dodwell had appealed concerning that matter, truly represented. Bishop Hoadly observes, that in this letter he answered Mr Dodwell in so excellent a manner, both with regard to the philosophical part, and to the opinions of some of the primitive writers, upon whom these doctrines were fixed, that it gave universal satisfaction. But this controversy did not stop here; for the celebrated Collins, coming in as a second to Dodwell, went much farther into the philosophy of the dispute, and indeed seemed to produce all that could possibly be said against the immateriality of the soul, as well as the liberty of human actions. This enlarged the scene of the dispute; into which our author entered, and wrote with such a spirit of clearness and demonstration, as at once showed him greatly superior to his adversaries in metaphysical and physical knowledge; and made every intelligent reader rejoice, that such an incident had happened to provoke and extort from him that plenty of strong reasoning and perspicuity of expression, which were indeed very much wanted upon this intricate and obscure subject. "And I am persuaded (continues the bishop), that as what he has writ in this controversy comprehends the little that the ancients had said well, and adds still more evidence than ever clearly appeared before, and all in words that have a meaning to them, it will remain the standard of good sense on that side of the question, on which he spent so many of his thoughts, as upon one of his favourite points." Clarke's letter to Dodwell was soon followed by four defences of it, in four several letters to the author of "A Letter to the learned Mr Henry Dodwell; containing some Remarks on a pretended Demonstration of the Immateriality and natural Immortality of the Soul, in Mr Clarke's Answer to his late Epistolary Discourse, &c." They were afterwards all printed together; and the "Answer to Toland's Amyntor" added to them.

In the midst of all these labours, he found time to show his regard to mathematical and physical studies, and exact knowledge and skill in them. And his natural affection and capacity for these studies were not a little improved by the friendship of Sir Isaac Newton; at whose request he translated his "Optics" into Latin in 1706. With this version Sir Isaac was so highly pleased, that he presented him with the sum of L. 500, or L. 100 for each child, Clarke having then five children.

This year also, bishop Moore, who had long formed a design of fixing him more conspicuously, procured for him the rectory of St Bennet's, Paul's Wharf, in London; and soon after carried him to court, and recommended him to the favour of queen Anne. She appointed him one of her chaplains in ordinary; and, in consideration of his great merit, and at the request of the bishop, presented him to the rectory of St James's, Westminster, when it became vacant in 1709. Upon his advancement to this station, he took the degree of D. D. when the public exercise which he performed for it at Cambridge was prodigiously admired. The questions which he maintained were these; 1. "Nullum fidei Christianæ dogma, in sacris scripturis traditum, est rectæ rationi dissentaneum:" that is, "No article of the Christian faith, delivered in the holy Scriptures, is disagreeable to right reason." 2. "Sine actionum humanarum libertate nulla potest esse religio:" that is, "Without the liberty of human actions there can be no religion." His thesis was upon the first of these questions: which being thoroughly sifted by that most acute disputant professor James, he made an extempore reply, in a continued discourse for near half an hour, with so little hesitation, that many of the auditors declared themselves astonished; and owned, that if they had not been within sight of him, they should have supposed him to have read every word of it from a paper. After this, through the course of the syllogistical disputation, he guarded so well against the arts which the professor was a complete master of; replied so readily to the greatest difficulties such an objector could propose; and pressed him so close and hard with clear and intelligible answers, that perhaps there never was such a conflict heard in those schools. The professor, who was a man of humour as well as learning, said to him at the end of the disputation, "Profecto, me probe exercuisti;" that is, "On my word, you have worked me sufficiently;" and the members of the university went away, admiring, as indeed they well might, that a man even of Clarke's abilities, after an absence of so many years, and a long discourse of business of quite another nature, should acquit himself in such a manner, as if this sort of academical exercise had been his constant employment; and with such fluency and purity of expression, as if he had been accustomed to no other language in conversation but Latin. The same year, 1709, he revised and corrected Whiston's translation of the "Apostolical Constitutions" into English. Whiston tells us, that his own studies having been chiefly upon other things, and having rendered him incapable of being also a critic in words and languages, he desired his great friend and great critic Dr Clarke to revise that translation; which he was so kind as to agree to.

Clarke.

Clarke.

In 1712, he published a most beautiful and pompous edition of Cæsar's commentaries, adorned with elegant sculptures. It is intituled, "C. Julii Cæsaris quæ extant, accuratissime cum libris editis & mss. optimis collata, recognita, & correctâ; accesserunt annotationes Samuelis Clarke, S. T. P. item indices locorum, rerumque & verborum, utilissimæ." It was printed in 1712, folio; and afterwards in 1720, 8vo. It was dedicated to the great duke of Marlborough, "at a time," says Bishop Hoadly, "when his unequalled victories and successes had raised his glory to the highest pitch abroad, and lessened his interest and favour at home." In the publication of this book, the doctor took particular care of the punctuation. In the annotations, he selected what appeared the best and most judicious in former editors, with some corrections and emendations of his own interspersed. Mr Addison has spoken of this folio edition of Cæsar's commentaries in the following words: "The new edition, which is given us of Cæsar's commentaries, has already been taken notice of in foreign gazettes, and is a work that does honour to the English press. It is no wonder that an edition should be very correct, which has passed thro' the hands of one of the most accurate, learned, and judicious writers this age has produced. The beauty of the paper, of the character, and of the several cuts with which this noble work is illustrated, makes it the finest book that I have ever seen; and is a true instance of the English genius, which, though it does not come the first into any art, generally carries it to greater heights than any other country in the world." This noble work has risen in value from that time to the present. A copy of this edition in large paper, most splendidly bound in morocco, was sold at the Hon. Mr Beauchamp's sale for forty-four pounds; and it was said to be purchased by the Duke of Grafton. "To a prince or a nobleman (says Dr Harwood), it was a cheap purchase; for it was the most magnificent book I ever beheld. The binding cost Mr Beauchamp five guineas.

The same year, 1712, he published his celebrated book intituled, "The Scripture Doctrine of the Trinity, &c." which is divided into three parts. The first is, a collection and explication of all the texts in the "New Testament," relating to the doctrine of the Trinity: in the second, the foregoing doctrine is set forth at large, and explained in particular and distinct propositions; and in the third, the principal passages in the liturgy of the church of England, relating to the doctrine of the Trinity, are considered. Bishop Hoadly applauds our author's method of proceeding, in forming his sentiments upon so important a point: "He knew (says he), and all men agreed, that it was a matter of mere revelation. He did not therefore retire into his closet, and set himself to invent and forge a plausible hypothesis, which might fit easily upon his mind. He had not recourse to abstract and metaphysical reasonings to cover or patronize any system he might have embraced before. But, as a Christian, he laid open the New Testament before him. He searched out every text in which mention was made of the three persons, or any one of them. He accurately examined the meaning of the words used about every one of them; and by the best rules of grammar and critique, and by his skill in language, he endeavoured to fix plainly what was declared about every person, and what was not. And what he thought to be the truth, he pub-

lished under the title of 'The Scripture Doctrine of the Trinity.' "I am far (says the Bishop) from taking upon me to determine, in so difficult a question between him and those who made replies to him: but this I hope I may be allowed to say, that every Christian divine and layman ought to pay his thanks to Dr Clarke for the method into which he brought this dispute; and for that collection of texts of the New Testament, by which at last it must be decided, on which side soever the truth may be supposed to lie." Whiston informs us, that some time before the publication of this book, there was a message sent to him from lord Godolphin, and others of queen Anne's ministers, importing, "That the affairs of the public were with difficulty then kept in the hands of those that were for liberty; that it was therefore an unreasonable time for the publication of a book that would make a great noise and disturbance; and that therefore they desired him to forbear till a fitter opportunity should offer itself:" which message (says he) the doctor had no regard to, but went on according to the dictates of his own conscience with the publication of his book. The ministers, however, were very right in their conjectures; for the work made noise and disturbance enough, and occasioned a great number of books and pamphlets, written by himself and others.

Books and pamphlets, however, were not all which the "Scripture Doctrine of the Trinity" occasioned: it made its author obnoxious to the power ecclesiastical, and his book to be complained of by the Lower House of convention. The doctor drew up a preface, and afterwards gave in several explanations, which seemed to satisfy the Upper House; at least the affair was not brought to any issue, the members appearing desirous to prevent dissensions and divisions.

In 1715 and 1716, he had a dispute with the celebrated Leibnitz, relating to the principles of natural philosophy and religion; and a collection of the papers which passed between them was published in 1717. This performance of the doctor's is inscribed to her late majesty queen Caroline, then princess of Wales, who was pleased to have the controversy pass through her hands. It related chiefly to the important and difficult subjects of liberty and necessity.

In 1718, Dr Clarke made an alteration in the forms of doxology in the singing psalms, which produced no small noise and disturbance, and occasioned some pamphlets to be written. The alteration was this:

To God, through Christ, his only Son,
Immortal glory be, &c.

And,

To God, through Christ, his Son, our Lord,
All glory be therefore, &c.

A considerable number of these select psalms and hymns having been dispersed by the Society for Promoting Christian Knowledge, before the alteration of the doxologies was taken notice of, he was charged with a design of imposing upon the society: whereas, in truth, the edition of them had been prepared by him for the use of his own parish only, before the society had thoughts of purchasing any of the copies: and as the usual forms of doxology are not established by any legal authority, ecclesiastical or civil, in this he had not offended.

About this time he was presented by the lord Lechmere,

Clarke. mere, the chancellor of the duchy of Lancaster, to the mastership of Wigston's hospital in Leicester. In 1724, he published 17 sermons preached on several occasions, 11 of which were never before printed; and the year following, a sermon, preached at the parish church of St James's, upon the erecting a charity school for the education of women servants. In 1727, upon the death of Sir Isaac Newton, he was offered by the court the place of master of the Mint, worth *communibus annis* 1200 or 1500*l.* a-year. But to this secular preferment he could not reconcile himself; and therefore absolutely refused it. Whiston seems to wonder, that Clarke's elogists should lay so little stress upon this refusal, as to mention it not at all, or at least very negligently: while "he takes it," he says, "to be one of the most glorious actions of his life, and to afford undeniable conviction, that he was in earnest in his religion." In 1728, was published, "A Letter from Dr Clarke to Mr Benjamin Hoadly, F. R. S. occasioned by the Controversy, relating to the Proportion of Velocity and Force in Bodies in Motion;" and printed in the "Philosophical Transactions, n^o 401.

In 1729, he published the 12 first books of "Homer's Iliad." This edition was printed in 4to, and dedicated to the duke of Cumberland. The Latin version is almost entirely new; and annotations are added to the bottom of the pages. Homer, Bishop Hoadly tells, was Clarke's admired author, even to a degree of something like enthusiasm, hardly natural to his temper; and that in this he went a little beyond the bounds of Horace's judgment, and was so unwilling to allow the favourite poet eye to nod, that he has taken remarkable pains to find out, and give a reason for every passage, word, and title, that could create any suspicion. "The translation," adds the Bishop, "with his corrections, may now be styled accurate; and his notes, as far as they go, are indeed a treasury of grammatical and critical knowledge. He was called to his task by royal command; and he has performed it in such a manner, as to be worthy of the young prince, for whom it was laboured." The year of its publication was the last of this great man's life. Though not robust, he had always enjoyed a firm state of health, without any indisposition bad enough to confine him, except the small-pox in his youth; till, on Sunday May 11. 1729, going out in the morning to preach before the judges at Serjeant's inn, he was there seized with a pain in his side, which made it impossible for him to perform the office he was called to; and quickly became so violent, that he was obliged to be carried home. He went to bed, and thought himself so much better in the afternoon, that he would not suffer himself to be blooded; against which remedy, it is remarkable that he had entertained strong prejudices. But the pain returning violently about two the next morning, made bleeding absolutely necessary; he appeared to be out of danger, and continued to think himself so, till the Saturday morning following; when, to the inexpressible surprise of all about him, the pain removed from his side to his head; and, after a very short complaint, took away his senses so, as they never returned any more. He continued breathing till between seven and eight of the evening of that day, which was May 17. 1729; and then died, in his 54th year.

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Soon after his death were published, from his original manuscripts, by his brother Dr John Clarke, dean of Sarum, "An Exposition of the Church Catechism," and ten volumes of sermons, in 8vo. His "Exposition" is made up of those lectures he read every Thursday morning for some months in the year, at St James's church. In the latter part of his time he revised them with great care, and left them completely prepared for the press. As to the sermons, few discourses in the English language are more judicious, and fewer still are equally instructive. The reasoning and the practical parts are excellent, and the explanations of scripture are uncommonly valuable. Though Dr Clarke had not the turn of mind which qualified him for moving the passions, and indeed did not make it his object, his sentiments, nevertheless, are frequently expressed with such a clearness of conception and such a force of language, as to produce in well disposed readers all the effect of the pathetic. Several volumes of sermons have been published since his time, which are far superior in point of elegance and beauty, and we have the highest sense of their merit. But still, if we were called upon to recommend discourses, which abound with the most solid instruction, and promise the most lasting improvement, we should never forget a Clarke and a Jortin. Three years after the Doctor's death, appeared also the Twelve Last Books of the Iliad, published in 4to by his son, Mr Samuel Clarke, who informs us, in the preface, that his father had finished the annotations to the three first of those books, and as far as the 359th verse of the fourth; and had revised the text and version as far as verse 510 of the same book. Dr Clarke married Catharine, the daughter of the Rev. Mr Lockwood, rector of Little Misfingham in Norfolk; in whose good sense and unblameable behaviour he was happy to his death. By her he had seven children, two of whom died before him, and one a few weeks after him.

Of the character of this great divine, the following short delineation appeared some years since in the Gentleman's Magazine: "Samuel Clarke, D. D. rector of St James's, Westminster: in each several part of useful knowledge and critical learning, perhaps without a superior; in all united, certainly without an equal: in his works, the best defender of religion; in his practice, the greatest ornament to it: in his conversation communicative, and in an uncommon manner instructive; in his preaching and writings, strong, clear, and calm; in his life, high in the esteem of the wise, the good, and the great; in his death, lamented by every friend to learning, truth, and virtue." In the same publication some not incurious anecdotes concerning him are printed, collected by the Rev. Mr Jones of Welwyn. We learn from them, that Dr Clarke was of a very humane and tender disposition. When his young children amused themselves with tormenting and killing flies upon the windows, he not only forbade such practices, but calmly reasoned with them, in such a familiar manner, as was calculated to make a powerful impression upon their minds. He was very ready and condescending in answering applications to him with respect to scruples; numberless instances of which occurred in the course of his life. One thing of which Dr Clarke was peculiarly cautious, was not to lose the least minute of his time. He al-

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Clarke.

Clarke.

ways carried some book about with him, which he would read whilst riding in a coach, or walking in the fields, or if he had any leisure moments free from company or his other studies. Nay, he would read even in company itself, where he might take such a liberty without offence to good manners. His memory was remarkably strong. He told Mr Pyle of Lyn, that he never forgot any thing which he had once thoroughly apprehended and understood. The Doctor, with his intimate friends, was perfectly free and easy; but if strangers were introduced, he behaved with much circumspection, conversing only upon common topics. When he visited Dr Sykes, his usual way was to sit with him upon a couch, and, reclining upon his bosom, to discourse with him, in the most familiar manner, upon such subjects as were agreeable to the taste and judgment of both. When Sir John Germaine lay upon his death-bed, and was in great confusion and trouble of mind, he sent for Dr Clarke, and requested to know of him whether he should receive the sacrament, and what he should do in his sad condition. The Doctor, who was well acquainted with Sir John's pursuits and course of life, sedately replied, that he could not advise him to receive the sacrament, and that he did not think it likely to be of any avail to him with respect to his final welfare. Having said this, he departed without administering the communion, having first recommended the dying man to the mercy of God.

Dr Clarke was of a cheerful, and even playful disposition. An intimate friend of his, the late Rev. Mr Bott, used to relate, that once when he called upon him, he found him swimming upon a table. At another time, when the two Dr Clarkes, Mr Bott, and several men of ability and learning were together, and amusing themselves with diverting tricks, Dr Samuel Clarke, looking out of the window, saw a grave blockhead approaching to the house; upon which he cried out, "Boys, boys, be wise, here comes a fool." This turn of his mind hath since been confirmed by Dr Warton, who, in his observations on the following line of Mr Pope,

"Unthought of frailties cheat us in the wife,"

says, "Who could imagine that Locke was fond of romances; that Newton once studied astrology; that Dr Clarke valued himself for his agility, and frequently amused himself, in a private room of his house, in leaping over the tables and chairs; and that our author himself was a great epicure?" With respect to what is here recorded of Dr Clarke, we can scarcely persuade ourselves to consider it as a frailty. To be possessed of such a temper as his was, must have been no small degree of happiness; as it probably enabled him to pursue his important and serious studies with greater vivacity and vigour. To be capable of deriving amusement from trivial circumstances, indicates a heart at ease, and may generally be regarded as the concomitant of virtue.

CLARKE (William), an English divine, was born at Haghmon-abbey in Shropshire, 1696: and after a grammar-education at Shrewsbury school, was sent to St John's college Cambridge, of which he was elected fellow, Jan. 17. 1716; B. A. 1731, M. A. 1735. He was presented by archbishop Wake in 1724 to the rec-

Clarke.

tory of Buxted in Suffex, at the particular recommendation of Dr Wotton, whose daughter he married. In 1738, he was made prebendary and residentiary of the cathedral church of Chichester. Some years before this he had given to the public a specimen of his literary abilities, in a preface to his father-in-law Dr Wotton's *Leges Walliæ Ecclesiasticæ et Civiles Hoeli Boni, et aliorum Walliæ Principum*; or, Ecclesiastical and Civil Laws of Howel, D Da, and other princes of Wales. There is reason likewise to surmise, that an excellent Discourse on the Commerce of the Romans, which was highly extolled by Dr Taylor in his Elements of the Civil Law, might have been written by our author. It came either from his hand or from that of his friend Mr Bowyer, and is reprinted in that gentleman's Miscellaneous Tracts. But Mr Clarke's chief work was, The Connection of the Roman, Saxon, and English Coins; deducing the Antiquities, Customs, and Manners of each people to modern times; particularly the Origin of Feudal Tenures, and of Parliaments: Illustrated throughout with critical and historical Remarks on various Authors, both sacred and profane. This work was published, in one volume quarto, in 1767; and its appearance from the press was owing to the discovery made by Martin Folkes, Esq; of the old Saxon pound. It was dedicated to the duke of Newcastle, whose beneficent disposition is celebrated for having conferred obligations upon the author, which were not the effects of importunity. Mr Clarke's performance was perused in manuscript by Arthur Onslow, Esq; speaker of the house of commons, who honoured him with some useful hints and observations: but he was chiefly indebted to Mr Bowyer, who took upon him all the care of the publication, drew up several of the notes, wrote part of the dissertation on the Roman sesterce, and formed an admirable index to the whole. By this work our author acquired a great and just reputation. Indeed, it reflects honour upon the country by which it is produced: for there are few performances that are more replete with profound and curious learning. Mr Clarke's last promotions were the chancellorship of the church of Chichester, and the vicarge of Amport, which were bestowed upon him in 1770. These preferments he did not long live to enjoy, departing this life on the 21st of October, in the following year. He had resigned, in 1768, the rectory of Buxted to his son Edward. In Mr Nichols's Anecdotes of Bowyer, there are several letters and extracts of letters, written to that learned printer by Mr Clarke, which display him to great advantage as a man of piety, a friend, and a scholar.

In a sketch of his character in the *Biographia Britannica*, furnished by Mr Hayley, who was his intimate acquaintance, he is represented as not only a man of extensive erudition, but as possessed of the pleasing talent of communicating his various knowledge in familiar conversation, without any appearance of pedantry or presumption. Antiquities were the favourite study of Mr Clarke, as his publications sufficiently show: but he was a secret, and by no means an unsuccessful, votary of the muses. He wrote English verse with ease, elegance, and spirit. Perhaps there are few better epigrams in our language than the following, which

Clarke which he composed on seeing the words *Domus ultima*
 || inscribed on the vault belonging to the dukes of Rich-
 Clary. mond in the cathedral of Chichester.

Did he, who thus inscrib'd the wall,
 Not read, or not believe St Paul,
 Who says there is, where'er it stands,
 Another house not made with hands?
 Or, may we gather from these words,
 That this house is not a house of Lords?

Among the happier little pieces of his sportive poetry, there were some animated stanzas, describing the character of the twelve English poets, whose portraits engraved by Vertue, were the favourite ornament of his parlour: but he set so modest and humble a value on his poetical compositions, that they were seldom committed to paper, and are therefore very imperfectly preserved in the memory of those to whom he sometimes recited them. His taste and judgment in poetry appears indeed very striking in many parts of his learned and elaborate *Connection of Coins*. His illustration of Nestor's cup, in particular, may be esteemed as one of the happiest examples of that light and beauty which the learning and spirit of an elegant antiquarian may throw on a cloudy and mistaken passage of an ancient poet. In strict attention to all the duties of his station, in the most active and unwearied charity, he might be regarded as a model to the ministers of God. Though his income was never large, it was his custom to devote a shilling in every guinea that he received to the service of the poor. As a master, as a husband, and a father, his conduct was amiable and endearing; and to close this imperfect sketch of him with his most striking feature, he was a man of genuine unaffected piety."

CLARO OBSCURO, or CLAIR-OBSCURE, in painting, the art of distributing to advantage the lights and shadow of a piece, both with respect to the easing of the eye and the effect of the whole piece. See PAINTING.

CLARO Obscuro, or Chiaro-scuro, is also used to signify a design consisting only of two colours, most usually black and white, but sometimes black and yellow; or it is a design washed only with one colour, the shadows being of a dusky brown, and the lights heightened up by white.

The word is also applied to prints of two colours taken off at twice: whereof there are volumes in the cabinets of those who are curious in prints.

CLARUS, or CLAROS (anc. geog.), a town of Ionia, famous for an oracle of Apollo. It was built by Manto, daughter of Tiresias, who fled from Thebes after it had been destroyed by the Epigoni. She was so afflicted with her misfortunes, that a lake was formed with her tears, where she first founded the oracle. Apollo was from thence surnamed *Clarius*. Also an island of the Ægean, between Tenedos and Scios.

CLARY, in botany. See SALVIA.

CLARY-Water, is composed of brandy, sugar, clary-flowers, and cinnamon, with a little ambergris dissolved in it. It helps digestion, and is cardiac. This water is rendered either purgative or emetic, by adding resin of jalap and scammony, or *crocus metalorum*. Some make clary-water of brandy, juice of cherries, strawberries, and gooseberries, sugar, cloves, white pepper, and coriander seeds; infused, sugared, and strained.

CLASMIUM, in natural history, the name of a genus of fossils, of the class of the gypsums; the characters of which are, that they are of a soft texture, and of a dull opaque look, being composed, as all the other gypsums, of irregularly arranged flat particles.

The word is derived from the Greek *κλασμα*, a fragment or small particle; from the flaky small particles of which these bodies are composed. Of this genus there is only one known species: this is of a tolerably regular and even structure; though very coarse and harsh to the touch. It is of a very lively and beautiful red in colour; and is found in thick roundish masses, which, when broken, are to be seen composed of irregular arrangements of flat particles; and emulate a striated texture. It will neither give fire with steel nor ferment with acids; but calcines very freely and easily, and affords a very valuable plaster of Paris, as do all the purer gypsums. It is common in Italy, and is greatly esteemed there; it is also found in some parts of England, particularly Derbyshire, but there it is not much regarded.

CLASPERS, or TENDRILS. See CIRRHUS.

CLASS, an appellation given to the most general subdivisions of any thing: thus, *animal* is subdivided into the classes quadrupeds, birds, fishes, &c. which are again subdivided into serieses or orders; and these last into genera. See BOTANY and ZOOLOGY.

CLASS, is also used in schools, in a synonymous sense with *form*, for a number of boys all learning the same thing.

CLASSIC, or CLASSICAL, an epithet, chiefly applied to authors read in the classes at schools.

This term seems to owe its origin to Tullius Servius, who, in order to make an estimate of every person's estate, divided the Roman people into six bands, which he called *classes*. The estate of the first class was not to be under 200 l. and these by way of eminence were called *classici*, "classics": hence authors of the first rank came to be called *classics*, all the rest being said to be *infra classem*: thus Aristotle is a classic author in philosophy; Aquinas in school divinity, &c.

CLASSICUM was the alarm for battle, given by the Roman generals; and sounded by trumpets and other martial music throughout the army.

CLATHRI, in antiquity, bars of wood or iron, used in securing doors and windows. There was a goddess called *Clathra*, that presided over the clathri.

CLAVARIA, CLUB-TOP: A genus belonging to the cryptogamia class of plants, and of the order of fungi; the 58th in the natural method. The fungus is smooth and oblong. The hemotades, or oak leather club top, exactly resembles tanned leather, except that it is thinner and softer. It is of no determinate form. It grows in the clefts and hollows of old oaks, and sometimes on ash in Ireland and in some places of England, &c. In Ireland it is used to dress ulcers, and in Virginia to spread plasters upon, instead of leather. The *militaris*, and one or two other species, are remarkable for growing only on the head of a dead insect in the nymph state.

A modern writer on natural history (Mr Miller), has asserted the whole genus of clavaria to belong to the tribe of *zoophytes* that is, to the animal, and not to the vegetable kingdom. According to his method, he ranks them among the Vermes, under a subdivision

Clasmius
 ||
 Clavaria

Clavarium
||
Claude.

which he terms *Fungosa osculis atomiferis*; thereby understanding them to be compound animals with many orifices on their surface, from which are protruded atoms or animalcules which have a visible spontaneous motion, something similar to what is now acknowledged to be a fact with regard to a numerous class of marine bodies termed *corallines*. This motion, however, has not been observed by other naturalists. Schœffer has figured the seeds of several clavariæ as they appeared to him through the microscope; and none of these fungi, when burnt, emit the strong disagreeable smell peculiar to animal substances.

CLAVARIUM, in antiquity, an allowance the Roman soldiers had for furnishing nails to secure their shoes with. They raised frequent mutinies, demanding largesses of the emperors under this pretence.

CLAVATA VESTIMENTA, in antiquity, habits adorned with purple clavi, which were either broad or narrow. See CLAVUS.

CLAUBERGE (John), a learned professor of philosophy and divinity at Duisburg, was born at Solingen in 1622. He travelled into Holland, France, and England, and in each country obtained the esteem of the learned. The elector of Brandenburg gave him public testimonies of his esteem. He died in 1665. His works were printed at Amsterdam in 2 vols 4to. The most celebrated of these is his treatise, entitled *Logica vetus et nova* &c.

CLAUDE of LORRAIN or *Claude Gelee*, a celebrated landscape painter, and a striking example of the efficacy of industry to supply, or at least to call forth, genius. Claude was born in 1600; and being dull and heavy at school, was put apprentice to a pastry-cook: he afterwards rambled to Rome to seek a livelihood; but being very ill-bred, and unacquainted with the language, no body cared to employ him. Chance threw him at last in the way of Augustino Trasso, who hired him to grind his colours, and to do all his household drudgery, as he kept no other servant. His master hoping to make him serviceable to him in some of his greatest works, taught him by degrees the rules of perspective and the elements of design. Claude at first did not know what to make of those principles of art; but being encouraged, and not failing in application, he came at length to understand them. Then his soul enlarged itself apace, and cultivated the art with wonderful eagerness. He exerted his utmost industry to explore the true principles of painting by an incessant examination of nature, that genuine source of excellence; for which purpose, he made his studies in the open fields; where he very frequently continued from sun rise till the dusk of the evening compelled him to withdraw himself from his contemplations. It was his custom to sketch whatever he thought beautiful or striking; and every curious tinge of light, on all kinds of objects, he marked in his sketches with a familiar colour; from which he perfected his landscapes with such a look of real nature, and gave them such an appearance of truth, as proved superior to any artist that ever painted in that style.

The beauties of his paintings are derived from nature herself, which he examined with uncommon assiduity; and Sandrat relates, that Claude used to explain to him, as they walked through the fields, the causes of the different appearances of the same prospect

at different hours of the day, from the reflections or refractions of light, from dews or vapours, in the evening or morning, with all the precision of a philosopher. He worked on his pictures with great care, endeavouring to bring them to perfection, by touching them frequently over again; and if any performance did not answer his idea, it was customary with him to alter, to deface, and repaint it again several times over, till it corresponded with that image pictured in his mind. But whatever struck his imagination, while he observed nature abroad, it was so strongly impressed on his memory, that on his return to his work, he never failed to make the happiest use of it.

His skies are warm and full of lustre, and every object is properly illumined. His distances are admirable, and in every part a delightful union and harmony not only excite our applause but our admiration. His invention is pleasing, his colouring delicate, and his tints have such an agreeable sweetness and variety, as have been but imperfectly imitated by the best subsequent artists, but were never equalled. He frequently gave an uncommon tenderness to his finished trees by glazing; and in his large compositions which he painted in fresco, he was so exact that the distinct species of every tree might readily be distinguished. As to his figures, if he painted them himself, they are very indifferent; and he was so conscious of his deficiency in this respect, that he usually engaged other artists who were eminent to paint them for him; of which number were Courtois and Philipppo Laura. His pictures are now very rare, especially such as are undamaged; and those are at this time so valued, that no price, however great, is thought to be superior to their merit. In order to avoid a repetition of the same subject, and also to detect such copies of his works as might be injurious to his fame, by being sold for originals, it was his custom to draw (in a paper-book prepared for his purpose) the designs of all those pictures which were transmitted to different countries; and on the back of the drawings, he wrote the name of the person who had been the purchaser. That book, which he titled *Libro di Verita*, is now in the possession of the duke of Devonshire.

CLAUDE (John), a Protestant divine, born in the province of Angenois in 1619. Mess. de Port Royal using their utmost endeavours to convert M. de Turenne to the catholic faith, presented him with a piece calculated to that end, which his lady engaged Mr Claude to answer; and his performance gave rise to the most famous controversy that was ever carried on in France between the Roman Catholics and Protestants. On the revocation of the edict of Nantz, he retired to Holland, where he met with a kind reception, and was honoured with a considerable pension by the prince of Orange. He died in 1687; and left a son Isaac Claude, whom he lived to see minister of the Walloon church at the Hague, and who published several excellent works of his deceased father.

CLAUDIA, a vestal virgin at Rome, who being suspected of unchastity, is said to have been cleared from that imputation in the following manner: the image of Cybele being brought out of Phrygia to Rome in a barge, and it happening to stick so fast in the river Tyber that it could not be moved, she tying her girdle, the badge of chastity, to the barge, drew

Claude,
Claudia.

Claudia, it along to the city, which a thousand men were unable to do.

CLAUDIA Aqua (Frontinus), water conveyed to Rome by a canal or aqueduct of eleven miles in length, the contrivance of Appius Claudius the censor, and the first structure of the kind, in the year of Rome 441. Called also *Aqua Appia*.

CLAUDIA Copia (Inscriptions), a name of *Lugdunum* or Lyons in France; the birth-place of the emperor Claudius: A Roman colony called *Claudia*, from its benefactor the emperor; and *Copia*, from its plenty of all necessaries, especially corn. See *LUGDUNUM*.

CLAUDIA, or *Clodia Via* (Ovid), was that road which beginning at the Pons Milvius, joined the Flaminia, passing through Etruria, on the south side of the Lacus Sabatinus, and striking off from the Cassia, and leading to Luca (Antonine): large remains of it are to be seen above Bracciano (Holstenius).

CLAUDIA Lex, de Comitiis, was enacted by M. Cl. Marcellus in the year of Rome 702. It ordained, that at public elections of Magistrates no notice should be taken of the votes of such as were absent. Another, *de Usurâ*, which forbade people to lend money to minors on condition of payment, after the decease of their parents. Another *de Negotiatione*, by Q. Claudius the tribune, 535. It forbade any senator or father of a senator to have any vessel containing above 300 amphoræ, for fear of their engaging themselves in commercial schemes. The same law also forbade the same thing to the scribes and the attendants of the quæstors, as it was naturally supposed that people who had any commercial connections could not be faithful to their trust nor promote the interest of the state. Another, 576, to permit the allies to return to their respective cities, after their names were inrolled. Liv. 41. c. 9. Another to take away the freedom of the city of Rome from the colonists which Cæsar had carried to Novicomum.

CLAUDIANUS (Claudius), a Latin poet, flourished in the 4th century, under the emperor Theodosius, and under his sons Arcadius and Honorius. It is not agreed of what country he was a native; but he came to Rome in the year of Christ 395, when he was about 30 years old; and there insinuated himself into Stilicho's favour; who being a person of great abilities both for civil and military affairs, though a Goth by birth, was so considerable a person under Honorius, that he may be said for many years to have governed the western empire. Stilicho afterwards fell into disgrace, and was put to death; and it is more than probable that the poet was involved in the misfortunes of his patron, and severely persecuted in his person and fortunes by Hadrian, an Egyptian by birth, who was captain of the guards to Honorius, and succeeded Stilicho. There is reason, however, to think that he rose afterwards to great favour; and obtained several honours both civil and military. The princess Serena had a great esteem for Claudian, and recommended and married him to a lady of great quality and fortune in Lybia. There are a few little poems on sacred subjects, which through mistake have been ascribed by some critics to Claudian; and so have made him be thought a Christian. But St Austin, who was cotemporary with him, expressly says that he was a Heathen. The time of Claudian's death is uncertain,

nor do we know any farther particulars of his life than what are to be collected from his works, and which we have already related above. He is thought to have more of Virgil in his style than all the other imitators of him.

CLAUDIUS I. Roman emperor, A. D. 41. The beginning of his reign was very promising; but it was soon discovered that little better than an idiot filled the throne, who might easily be made a tyrant: accordingly he became a very cruel one, through the influence of his empress, the infamous Messalina; after her death, he married his niece Agrippina, who caused him to be poisoned to make way for Nero, A. D. 54. See (*History of*) *ROME*.

CLAUDIUS II. (Aurelius), surnamed *Gothicus*, signalized himself by his courage and prudence under the reigns of Valerian and Julian; and on the death of the latter was declared emperor in 268. He put to death Aureolus, the murderer of Galienus; defeated the Germans; and in 269 marched against the Goths, who ravaged the empire with an army of 300,000 men, which he at first harassed, and the next year entirely defeated: but a contagious disease, which had spread through that vast army, was caught by the Romans; and the emperor himself died of it a short time after, aged 56. Pollio says that this prince had the moderation of Augustus, the virtue of Trajan, and the piety of Antoninus.

CLAVES INSULÆ, a term used in the isle of Man; where all weighty and ambiguous causes are referred to a jury of twelve, who are called *claves insulæ*, the keys of the island.

CLAVICHORD, and **CLAVICITHERIUM**, two musical instruments used in the 16th century. They were of the nature of the spinet, but of an oblong figure. The first is still used by the nuns in convents; and that the practitioners may not disturb the sisters in the dormitory, the strings are muffled with small bits of fine woollen cloth.

CLAVICLE. See *ANATOMY*, n° 46.

CLAVICYMBALUM, in antiquity, a musical instrument with 30 strings. Modern writers apply the name to our harpsichords.

CLAVI VESTIUM, were flowers or studs of purple interwoven with or sewed upon the garments of knights or senators; only, for distinction, the former used them narrow, the latter broad.

CLAVIS properly signifies a key; and is sometimes used in English to denote an explanation of some obscure passages of any book or writing.

CLAVIUS (Christopher), a German Jesuit born at Bamberg, excelled in the knowledge of the mathematics, and was one of the chief persons employed to rectify the kalendar; the defence of which he also undertook against those who censured it, especially Scaliger. He died at Rome in 1612, aged 75. His works have been printed in five volumes folio; the principal of which is his commentary on Euclid's elements.

CLAUSE, in grammar, denotes a member of a period or sentence.

CLAUSE signifies also an article or particular stipulation in a contract, a charge or condition in a testament, &c.

CLAUSENBURG, a large city of Transilvania, situated

Claudius
||
Clausen-
burg.

Clavus
||
Clay.

situated on the river S mos, in E. Long. 20. 50. N. Lat. 47. 10.

CLAVUS, in antiquity, an ornament upon the robes of the Roman senators and knights; which was more or less broad according to the dignity of the person; hence the distinction of tunica angust-clavia and lat-clavia.

CLAVUS, in medicine and surgery, is used in several significations: 1. Clavus hystericus, is a shooting pain in the head, between the pericranium and cranium, which affect such as have the green-sickness. 2. Clavus oculorum, according to Celsus, is a callous tubercle on the white of the eye, taking its denomination from its figure. 3. Clavus imports indurated tubercles of the uterus. 4. It also imports a surgical instrument of gold, mentioned by Amatus Lusitanus, designed to be introduced into an exulcerated palate, for the better articulation of the voice. And, 5. It signifies a callus, or corn on the foot.

CLAVUS Annalis, in antiquity. So rude and ignorant were the Romans towards the rise of their state, that the driving or fixing a nail was the only method they had of keeping a register of time; for which reason it was called *clavus annalis*. There was an ancient law, ordaining the chief prætor to fix a nail every year on the Ides of September; it was driven into the right side of the temple of Jupiter Opt. Max. towards Minerva's temple. This custom of keeping an account of time by means of fixing nails, was not peculiar to the Romans; for the Etrurians used likewise to drive nails into the temple of their goddess Nortia with the same view.

CLAW, among zoologists, denotes the sharp-pointed nails with which the feet of certain quadrupeds and birds are furnished.

CLAY, in natural history, a genus of earths, the characters of which are these: They are firmly coherent, weighty, and compact; stiff, viscid, and ductile to a great degree, while moist, smooth to the touch; not easily breaking between the fingers, nor readily diffusible in water; and, when mixed, not readily subsiding from it. See CHEMISTRY, n° 647, &c.

Clay shrinks remarkably when drying; in so much that Dr Lewis observes, the purity of it may be known by the degree to which it shrinks. He made experiments on it pure, and when mixed with various proportions of sand. Pure clay he found shrunk one part in 18 while drying; but, when mixed with twice its weight of sand, only one part in 30.

The common clays are never free from siliceous earth: the best method of obtaining the argillaceous earth in perfect purity is, by dissolving Roman alum in water, filtering the solution, and precipitating it by mild volatile alkali. When procured by this method, its specific gravity is about 1305; it is soluble in acids with a little effervescence; it forms alum with the vitriolic acid; and deliquescent salts with the nitrous and marine. When dry it absorbs water greedily, and becomes soft, and acquires such a tenacity that it may be moulded at pleasure; it contracts, however, greatly in the fire, by which numerous cracks are occasioned. With a certain degree of heat it becomes so hard as to strike fire with steel, and by thus burning it loses its tenacity, the water being excluded by the approach of its particles towards each other. Af-

ter having lost this property, it cannot be made to assume it again without being dissolved in an acid, and then precipitated from it. Fixed alkalies also dissolve it in the dry way, as acids do in the moist; but of these last the vitriolic is the most proper, as it may be most easily concentrated.

According to Mr Kirwan, the specific gravity of this earth, when pure, does not exceed 2000. It is exceedingly diffusible in water, though scarcely more soluble than magnesia. It is combinable with acids, from whence it may be separated like magnesia, but can scarce be precipitated by the vitriolic acid, with which it forms alum, a salt that always contains an excess of acid, and has an astringent taste. When in combination with any of these acids, it cannot be precipitated by acid of sugar; a criterion by which it is distinguished from all the other earths; every one of which (terra ponderosa alone excepted, which when united to the vitriolic acid, is not affected by any other excepting that of flour) is precipitated from the vitriolic, nitrous, and marine acids, by that of sugar. The precipitation of these earths, however, does not take place if there be an excess of the mineral acids, nor does it always appear before the liquors are evaporated. Though clay is hardened by a very strong heat, it cannot be made thereby to assume the properties of lime. By a mixture with calcareous earth it readily melts; and hence M. Gerhard has found it fusible in a crucible of chalk, though not in one of clay. Its fusion is not promoted by fixed alkali, but borax and microcosmic salt dissolve it; the former with a very slight effervescence, but the latter with a more perceptible one. It is less affected by calces of lead than the calcareous earths are.

M. Beaume has formed a new hypothesis concerning this earth; supposing the basis of alum, or pure argillaceous earth, to be nothing else than flint; and common clay to be siliceous earth combined with a little vitriolic acid. This opinion has been examined by M. Scheele, who began by trying, in the following manner, whether the siliceous earth be in reality soluble in vitriolic acid. He took an ounce of mountain crystal reduced to powder, and mixing it with three ounces of salt of tartar, melted the whole by a strong fire. The mass was then dissolved in 20 ounces of water, and as much diluted vitriolic acid poured upon it as was more than sufficient for saturation. The liquor being then filtered and evaporated, yielded a drachm and an half of alum, besides a quantity of subacid vitriolated tartar. It now remained therefore to determine whether the precipitated siliceous earth, by a repetition of the same process, would still continue to yield alum. The operation was therefore repeated seven times, and a quantity of alum procured at each operation. But when our author was about to be confirmed in his opinion that M. Beaume was in the right, he happened to inspect his crucibles, and perceived them to be full of little cavities, and every where rough and uneven on the inside. Thus he began to suspect that the alkali had dissolved part of the clay of his crucibles, by which means the alum had been produced; and this supposition was verified by his afterwards using a crucible of iron, when he could not obtain a single particle of alum, nor perceive the smallest mark of solution on the siliceous earth.

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M. Beaume also pretends that clay contains a little vitriolic acid, and is therefore soluble in a large quantity of boiling water. Mr Scheele likewise tried this experiment; but found, that of several kinds of argillaceous earth not the smallest quantity was dissolved; and he likewise made several experiments in order to obtain vitriolic acid from pure clay, but without success: neither was he able to obtain any hepar either by means of alkali of tartar or with charcoal; nor could he obtain with clay a vitriolic neutral salt from the residuum of the distillation of muriatic and nitrous acid.

The contraction of clay by heat has afforded Mr Wedgwood an opportunity of constructing by its means an instrument for measuring those degrees of heat which are above the reach of the scale of common thermometers, as described under the article THERMOMETER.

Mr Scheele has made several experiments to discover the properties of alum when mixed with other substances. A solution of alum, he finds, is decomposed by lime-water; and if no more of the water be added than is exactly requisite for the precipitation, the earth of alum forms a transparent precipitate like boiled starch; and if the clear water be filtered, it is found to be a solution of gypsum. On adding more lime-water than is necessary for precipitation, the precipitated matter is destitute of the gelatinous appearance just mentioned. If the whole be allowed to stand for a quarter of an hour, and frequently agitated during this time, no gypsum, nor even lime, is found in the filtered liquor, unless too much lime-water has been used. On examining the precipitate in this case, our author found it to consist of earth of alum, selenite, and lime. This was discovered first by treating it with muriatic acid, which dissolved the aluminous earth, leaving the gypsum behind. The addition of caustic volatile alkali threw down a transparent gelatinous mass, which was the earth of alum; and on straining it again, and then adding a fixed alkaline lixivium, the lime was thrown down; whence it appeared, that the lime and gypsum had separated from the water, and united with the earth of alum.

To understand the reason of this uncommon precipitation, Mr Scheele next poured into a solution of alum a quantity of caustic volatile alkali more than sufficient to saturate the acid, in order to be certain of having it all taken off. The precipitated earth was then edulcorated, and mixed with a solution of gypsum, that he might observe whether the gypsum would separate from the water, and precipitate with the earth of alum; which, however, did not take place. On mixing lime-water with the precipitate, he found that the former very soon lost its caustic taste, and that the earth of alum became opaque. Some part of the water was strained, and lixivium tartari dropped into it; but it remained clear, nor was any precipitate formed by a solution of corrosive sublimate. He afterwards added muriatic acid to the last precipitate, which it dissolved entirely without leaving any gypsum behind; whence our author concludes, that the earth of alum had united with the lime into a peculiar kind of compound.

Lastly, he now imagined, that this compound of earth of alum and lime might be capable of separating gypsum from water. To try this, he prepared a large

quantity of the compound earth, mixed it with a solution of gypsum, and let it rest for a quarter of an hour; when he found, to his surprise, that the gypsum still remained suspended in the water, and that the precipitate was entirely soluble in muriatic acid. He now mixed a solution of gypsum with lime-water, adding earth of alum at the same time; when he found, that the whole was precipitated as before, the lime and aluminous earth having fallen to the bottom along with the gypsum, leaving the water pure. On the whole, our author concludes, 1. That the vitriolic acid in gypsum is capable of combining with more lime than is necessary to an exact saturation. 2. That calcareous earth is capable of forming an union with the earth of alum. 3. That gypsum cannot combine with the earth of alum; but that if a superfluous quantity of lime be united with vitriolic acid, it will then serve as a bond of union to combine gypsum with the earth of alum, and thus form a new compound consisting of three earths. Pure clay has no effect upon lime-water.

Cronstedt is of opinion, that common clay, especially the blue, grey, and red kinds, may derive their origin from mud; and as the mud proceeds from vegetables, it will thence follow, that the varieties of clay just mentioned are nothing else but the common mould altered, after a length of time, by means of water. This opinion, he thinks, receives considerable strength from the following circumstances; viz. that a great quantity of sea-plants rot every year in the lakes, and are changed into mud; very little of which, however, is seen upon the shores after the water is dried in the summer time; and that the clay begins where the mud ceases. Professor Bergman has likewise hinted, that pure clay may be a calcareous earth combined with some acid not yet discovered; "but (says he) compositions of this kind ought to be considered as primitive substances, with respect to our knowledge of them, till they shall be experimentally decomposed: for no sound knowledge in natural philosophy can be obtained from the consideration of mere possibilities; since daily experience shows, that even the most probable suppositions have proved false, when the means of putting them to the test have afterwards been found out."— "Now, therefore, (says M. Magellan), that the argillaceous is acknowledged to be a simple primitive earth, which cannot be decomposed into any other principles, nor formed by the combination of any other simple substances we know, we ought to rest satisfied at present without endeavouring to account for its formation."

The principal species of the argillaceous earths or clays are,

1. The *argilla aerata*, or *lac luna*. It is generally found in small cakes of the hardness of chalk; like which, also, it marks white. Its hardness is nearly like that of the steatites, and it feels less fat than clays commonly do. It is of a snow-white colour, and about the specific gravity of 1.669. When examined with a microscope, it is found to consist of small transparent crystals; and, from Mr Schreber's experiments, appears to be an argillaceous earth saturated with fixed air, in consequence of which it effervesces with acids. It contains also a small quantity of calcareous earth, and sometimes of gypsum, with some slight traces of iron. It is found at Halles.

2. The *argilla apyra*, porcelain clay, the kaolin of the

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the Chinese, is very refractory in the fire, and cannot in any common strong fire be brought into fusion farther than to acquire a tenacious softness without losing its form. When broken, it has then a dim shining appearance, and is of a solid texture; strikes fire with steel; and has consequently the best chemical properties of any substance whereof vessels can be made. It is found of an excellent quality in Japan, and likewise in different parts of Europe. In Sweden it is met with in coal-pits between the strata of coal. Cronstedt informs us, that he has seen the root of a tree entirely changed into this kind of earth.

M. Magellan remarks, that we must be careful to distinguish between the pipe-clay of which there is plenty in Devonshire, and that used in the porcelain manufactures. The former, in a strong fire, burns to a bluish grey or pigeon colour, the latter remains white. The porcelain clay, according to our author, seems to be only a decayed feldt-spar; and, consequently, according to Mr Bergman, contains magnesia. Our porcelain clay contains likewise quartz, crystals, and mica, parts of the granite which it originally composed. Before it is used, the quartz must be separated, but the mica remains.

3. Combined with phlogiston, and including the white tobacco-pipe clay, with others of a grey, black, or violet colour. Mr Kirwan observes, that many of the white clays become grey in a low degree of heat, because the mineral oil with which they are mixed burns to a kind of coal, and tinges them; but this being consumed in a stronger heat, they again become white. The other clays evidently contain phlogiston; in consequence of which, they become quite black internally on being exposed to a quick and strong fire, assuming the appearance of common flints both in colour and hardness; but if heated by degrees, they are first white, and afterwards of a pearl colour. They contain a larger quantity of the inflammable principle in proportion to their apparent fatness; which may be judged of both by their smoothness and unctuousity, and by their shining when scraped with the nail. "It is difficult (says M. Magellan) to determine whether this strongly adherent phlogiston is the cause of the above mentioned pearl colour, or prevents them from being burned white in a strong fire; yet no heterogeneous substance can be extracted from them except sand, which may be separated from some by means of water, but does not form any constituent part of clay. If they be boiled in aqua-regis in order to extract their iron, they lose their viscosity." In the less unctuous clays, our author has found pure quartz in greater and smaller grains, and he has likewise found that clays of this kind sometime attract phlogiston in the fire.

4. The *lithomarga*, or stone-marrow, when dry, feels as fat and slippery as soap, but is not wholly diffusible in water. When mixed with this fluid, it falls to pieces either in larger or smaller masses, so as to assume the appearance of curds. In the fire it readily melts into a white or reddish frothy slag; which, in consequence of its internal vacuities, is then of a larger volume than it formerly was. In the mass it breaks into irregular scaly pieces. This kind is called fuller's earth (*waklera*) in Sweden. In Crim Tartary it is called *keffekil*; and is said to be used there instead of soap, for washing. It is found also in the Austrian Flanders in the barony of Hierges, near Niverle, belong-

ing to the Duke of Arenberg. It was showed to M. Magellan by the duke's chancellor; who, from the uprightness of his behaviour, has obtained the honourable appellation of *Jean de Bien*. At present it is only found in separate masses; but M. Magellan is of opinion, that some considerable strata of it might be met with, if properly searched for on the spot, by digging the ground to a considerable depth.

To this species also belongs the yellowish-brown earth called *terra lemnia*; which is of a shining texture, and falls to pieces in water with a crackling noise. According to Mr Bergman, this is a compound of the argillaceous, siliceous, and magnesian earths. Its component parts are the same as those of the talc, but looser, and in different proportions. M. Cronstedt remarks, that "the *terra lemnia* cannot properly be called a fuller's earth, as it is never used in the fulling business, nor is likely to be applicable to it, as being besides very scarce. The true fuller's earth of England agrees entirely with the description of the stone-marrow already given, and in colour and texture resembles that from Sweden, which is composed of coarse particles. The Hampshire fuller's earth is of a dusky brown, inclining to green, with veins of a faint yellow; and contains a small portion of muriatic acid, and of a yellow oily matter. Every fine clay that does not communicate a colour, is in general fit for the business of fulling; even the excrements of hogs, mixed with human urine, are used for this purpose in various woollen manufactures. The properties required in a good fuller's earth are, that it shall carry off the oily impurities of the woollen cloth, and at the same time thicken it by causing the hairs or fibers to curl up. The best is composed of fine siliceous earth with argilla, and a little calcareous earth without vitriolic acid; a little martial calx, however, is not hurtful, if unattended with any active menstruum.

The *terra lemnia* is so called from the island of Lemnos, now Statimane, in the *Ægean* Sea, from whence it is procured. It is likewise called the *Turkish earth*, on account of its being impressed with the seal of the Grand Signior.

The Swedish fuller's earth is found in a mountain named *Osmund* at Ratwick in East Dalecarlia. The stratum is three feet thick, and the mountain itself is chiefly calcareous. It is of an ash colour; harder, and of finer particles, than the Lemnian earth.

"All these substances (the fuller's earths)," says M. Magellan, "are akin to zeolites, and likewise resemble some marles. But in the *Osmundian* earths, the connection of the parts is not merely mechanical, as in marles; which on that account effervesce strongly with acids, though they often contain a smaller quantity of calcareous earth or magnesia than the *litho marga*."

The following table shows the proportion of ingredients in each of the fuller's earths.

	<i>Terra lemnia.</i>	<i>Osmund fuller's earth.</i>	<i>Hampshire do.</i>
100 parts } contain			
Siliceous earth,	47.0	60.0	51.8
Chalk,	5.4	5.7	3.3
Magnesia,	6.2	0.5	0.7
Argilla,	19.0	11.1	25.0
Calx of iron,	5.4	4.7	3.7
Water or volatile matter,	17.0	18.0	15.5
			5. Bolus,

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5. *Bolus*, bole, or iron-clay, is a fine and dense clay of various colours, containing a large quantity of iron, so that it is very difficult, or even impossible, to know the natural and specific qualities of the bole itself. It is not so easily softened in water when indurated as the porcelain and common clays; but either falls to pieces in the form of small grains, or repels the water, and cannot be made ductile. In the fire it grows black, and is then attracted by the loadstone.

Mr Kirwan thinks the term *bole* a word of such uncertain signification, that it ought to be banished from common use, or at least from every mineralogical treatise. "Some (says he) bestow this name upon very smooth compact clays, consisting of the finest particles: others require besides, that their colour should be red, yellow, or brown, and that they should contain iron." The red generally blacken in the fire; but, according to Rinman, without becoming magnetic. The yellow, when heated, become first red; and, in a strong heat, brown or black. What the Italians call *Calamita Bianca*, according to Ferber, is a white bole striated like asbestos. The true *sigillata rubra* contains calcareous earth; and, according to Rinman, becomes magnetic after torrefaction. The yellow, red, and brown clays contain most iron, sometimes dispersed through their substance, and sometimes united to the siliceous part: in this case they are fusible with greater difficulty. The yellow calx of iron is more dephlogisticated than the red, and the red than the brown. These clays do not become magnetic after calcination, unless they contain 14 or 15 per cent. of iron.

The soft boles are of various colours, as red, yellow, green, grey, and bluish grey. The red kind is that used in medicine under the name of *Armenian bole*; an indurated kind of which affords the material for the red pencils. Formerly, when the *terra sigillata* were esteemed in medicine, the druggists endeavoured to have them of all different colours: for which reason they not only sealed up all the natural sorts of clay, but such as had been mixed and coloured artificially; whence the class of boles was supposed to be much more numerous than it really is. Cronstedt concludes, that "since the greatest part of these *terra sigillata* contain iron, the bole must be a martial clay; and as such it seems to be more fit for medical uses than other clays, if any dead earth must be used internally, when there is such an abundance of finer substances.

The indurated bole or slate is of a reddish brown or grey colour, and is found in most coalleries between the seams of coal. It is met with frequently in pieces like nuts of various sizes; which, when broken, exhibit impressions of plants as the nodules of copper slate from Ilmenaus contain fish.

6. With scaly particles, the *horn-blende* of the Swedes. This is called *horn rock-stone* by Wallerius, who places it among the apyrous stones; but Linnaeus has put it among the calcareous stones by the name of *horn-flag*, *talcum corneum*. It is named *talcum striatum* by Rinman, and has the following properties: 1. Its specific gravity is never less than 2.660, and frequently rises to 3.880. 2. It has a strong earthy smell, which is particularly sensible on breathing upon it, or pouring hot water on it. 3. A toughness or

visciduity is perceived on pounding it in a mortar, as is the case with mica and horn; from which last it derives its name. 4. When pounded it affords a greenish-grey powder. 5. It is said to be fusible *per se*; though Mr Kirwan informs us, that he could never melt this stone even by the assistance of a blow-pipe. This stone is frequently mixed with pyrites. It is distinguished from the martial glimmer or mica by the scales being less shining, thicker, and rectangular. It is of two kinds, black, and greenish. The former, when rubbed fine, affords a green powder. It is the *corneum nitens* of Wallerius, and is either of a lamellated or granular texture; the former being sometimes so soft as to be scraped with the nail, and its surface frequently as glossy as if it had been greased; the specific gravity being from 3600 to 3880. It does not detonate with nitre, but becomes of a snuff-colour when heated, and then slightly effervesces with diluted nitrous acid; the solution assuming a greenish colour. In order to discover the principle on which the smell of this stone depends, Mr Kirwan boiled its powder in water; but could not discover, either by the taste or by any other method, that any thing had been communicated to the fluid. An hundred parts of the lamellar sort contain 37 of siliceous earth, 22 of pure argillaceous earth, 16 of magnesia, and two of calcareous earth, both in a mild state, together with 23 of calx of iron not much deplogisticated. The greenish kind is of a granular texture, or striated; the specific gravity of a specimen examined by Mr Kirwan was 2683. The common pale, greenish-grey whetstone seems to belong to this species.

7. The *zeolite* was first discovered by Cronstedt, and by him reckoned a genus distinct from every other; but on a proper chemical analysis, both Kirwan and Bergman have reckoned them among the argillaceous earths; and here M. Magellan observes, that, "it is not so much the quantity as the intensity or predominancy of property that should in general direct us in the classification of mineral bodies; no to mention, that if the rule respecting *quantity* were rigorously adhered to, the two primitive earths, magnesia and argil, would not be found among the earths; which would doubtless be an absurdity, as Bergman has rightly observed."

The properties of zeolite are, 1. It is a little harder than the fluors, and other calcareous spars; but is scratched by steel, and does not strike fire with it. 2. It melts easily in the fire, with an ebullition like borax, into a white frothy slag, which cannot, without great difficulty, be brought into a solid transparent state. 3. It dissolves more readily in the fire by the help of mineral alkali, than that of borax or microcosmic salt. 4. It does not ferment with the latter as lime does, nor with the former as those of the gypseous kind. 5. It dissolves very slowly, and without effervescence, in acids, as oil of vitriol and spirit of nitre. With the former a great heat arises, and the powder unites into a mass. By distillation with nitrous acid, some fixed and dephlogisticated airs are procured. Some sorts of zeolite, however, found in Sweden, do not melt by themselves in the fire, but are readily dissolved by the acid of nitre into a kind of jelly. 7. The fusible kinds, in the very moment of fusion, emit a phosphoric light.

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With regard to the component parts of zeolite, M. Bayen is of opinion that it consists of equal parts of siliceous and argillaceous earths, which is also confirmed by M. Guettard; but according to Mr Bergman's analysis, the red zeolite or Adelfores contains 80 per cent. of siliceous earth; 9.5 of argillaceous; 6.5 of pure calcareous earth; and four of water. The white, oval, radiated zeolite of *Feroe* in Iceland, contains, according to M. Pelletier, 50 of silex; 20 of argillaceous earth; 8 of pure calcareous earth; and 22 of water. According to Mr Mayer's analysis, a radiated zeolite yielded 58.33 per cent. of silex; 17.5 of argill; 6.66 of lime; and 17.5 of water. In general the crystallized kind contain more water than the other. At any rate, though the proportions of ingredients are various, silex always seems to predominate.

In general the zeolites are of a crystalline form, composed of imperfect pyramids turned towards a common centre; their form is sometimes globular, but seldom prismatic. Messrs. Faujas and Rome de l'Isle mention zeolites, of a cubic and other forms, found in Iceland, the Cyclops Islands near Etna in Sicily, the island of Bourbon, &c. their specific gravity is from 2.100 to 3.150; but this last is very rare. Fabroni mentions a semitransparent zeolite from Garphyttan in Sweden, which has an electric power. To the species of zeolite also belongs the lapis lazuli, from which ultramarine is made. See *Lapis Lazuli*, and *ULTRAMARINE*.

The sparry zeolite resembles a calcareous spar; but is of a more irregular figure, as well as more brittle. It is found in Sweden of a light red or orange colour.

The crystallized zeolites are met with in greater plenty than the other kinds; and are found in Sweden of various forms and colours. Brunich informs us, that in the north, the countries of the zeolites and of the chalcedony and catlong, pieces are shown as curiosities, in which the zeolite is inclosed in the chalcedony; but this is not sufficient to prove that the one was produced from the other.

Cronstedt observes, that the zeolites have nearly the same qualities in the fire as the boles. The property of swelling in the fire, like borax, is peculiar to the crystallized kind; the others rise only in some small blisters, which are of a white colour at their edges, and instantly cover themselves with a white glassy skin, after which they become quite refractory. According to Bergman they have a great affinity to the schoerls; but their component parts are not so strongly connected as to hinder the action of acids, which can destroy their combination, without being previously treated with fixed alkali; this last being a necessary requisite for analysing schoerls. Mr Pazumot is of opinion that the zeolites cannot be a volcanic production, but only a secondary one formed by the decomposition of volcanic earths. Pure basaltes and volcanic lavas have indeed the same component parts with the zeolites; and these last have not yet been found but among volcanic matters: but, as M. Faujas observes, there are many instances of true zeolites being quite buried within the bodies of solid basaltes, some being only fragments, and others complete zeolites; "which (says M. Magellan) undeniably proves, that the lat-

ter have been completely formed before these volcanic masses were produced by subterraneous fires.

8. *Tripoli* used in polishing hard substances. See *TRIPOLI*.

9. The common or *brick clay*, has the following properties. 1. It acquires a red colour, more or less deep, in the fire. 2. It melts pretty easily into a greenish glass. 3. It consists of a mixture of pure clay, siliceous and martial earth, containing also a small quantity of vitriolic acid. It is found in a state of purity of various colours, as red, pale-red, grey, and blue. In some provinces of Sweden a white kind is met with, often in a stony form, with fine sand between its strata; which when burnt is of a paler colour than any of the preceding, and does not cake well in the fire; it is also more fusible than any of them. In this country also is found a species called, by Cronstedt, *fermenting clay*, *argilla intumescens*. It is very like the preceding as to the external appearance and other qualities: but, when both are found in the same place, they seem to be different in regard to the fermenting property of this variety. "This fermentation (says our author) cannot be the effect of the sand mixed with it, because sand is found in them both: and besides, this kind ferments in the same manner when it is mixed with gravel or stones; and then it ferments later in the spring than the other, since by the stones, perhaps, the frost is longer retained in it.

This kind of clay is also found mixed with calcareous earth, in which case it is called *MARLE*. It is also found in an indurated state, and that either pure or mixed with phlogiston and a large quantity of vitriolic acid; in which case it constitutes the ores of alum. It is also found in this state mixed with calcareous earth, forming stone marle.

10. *Argillaceous fossil stones*. The most remarkable of these are, 1. The *schistus tegularis*, or common house-slate. It is of a bluish purple colour, does not strike fire with steel, and may be slightly scraped with the nail. It is very brittle, of a lamellar texture, and of the specific gravity 2.876; giving a clear sound when in pieces of half an inch thick. It is never transparent, but has a moderately fine grain, effervescing slightly with acids when powdered, but not otherwise. In the fire it loses upwards of 2 per cent. of its weight; detonates slightly with nitre, and then assumes a brownish red colour; however, it is not rendered magnetic by calcination. By a vehement heat it is fusible *per se*, and melts into a black scoria. It melts with difficulty in the dry way with mineral alkali, but more easily with borax and microcosmic salt, with little effervescence; and it melts with equal ease in chalk or clay vessels. By digestion for two months in dephlogisticated spirit of nitre, the menstruum assumes a green colour. According to Mr Kirwan, it contains 26 parts of argillaceous earth; 46 of siliceous; 8 of magnesia; 4 of calcareous earth; and 14 of iron. Part of the iron seems to be phlogisticated by a mineral oil united with it; and part dephlogisticated, or in a red calx. This last is united to the argillaceous part as well as to the siliceous, and cannot be separated without great difficulty. The colour of this slate varies to the pale, to the slightly purple, and to the bluish. The laminae of the last are thicker, their texture coarser, and they contain more siliceous earth and

Clay.

Clay. and less iron than the foregoing. Other stones are also made use of for covering houses; but their laminæ are much thicker, their surface more uneven, and their texture coarser. They belong chiefly to the sand stones, or to the calcareous kinds. The dark blue *schistus scriptorius* contains more magnesia and less iron than the foregoing, and therefore effervesces more briskly with acids. Its specific gravity is 2701. 2. The *pyriteous schistus*, to which also belongs that from which alum is made, is of a grey, blue, brown, or black colour; and is more or less decomposable by its exposure to air, according to the quantity of the pyrites, and the state of the iron in it. When the iron is in a semiphlogisticated state, the schistus will be easily decomposed; but much more slowly, if at all, when the calc is much dephlogisticated. 3. The *bituminous schistus* is generally black, of a lamellar texture, and various degrees of hardness. It never gives fire with steel, but emits a strong smell when heated, and sometimes without being heated. When scraped it does not produce any white mark like the other schistus. M. Magellan mentions a specimen found in Yorkshire which burned like coal, with a strong smell of bitumen.

There are various other species of argillaceous earths, as the flag-stone, sand or free stone, toad-stone, &c. for a description of which see these articles.

Clays are of very extensive use in common life. Some varieties of the porcelain clay become perfectly white in the fire; and it is not to be doubted but these are used in the porcelain manufactories. The indurated porcelain clay, however, cannot be easily heated without cracking; and therefore we can go no great length in hardening it. The boles have almost lost their value as medicines; but are still employed to make bricks, potter's ware, &c. Tripoli is of indispensable use in the business of polishing, and is likewise, on many occasions, used for making moulds to cast metals in.

In agriculture, clay is indispensably necessary; excepting, however, according to Cronstedt, the white and fermenting clays above mentioned, for which no use has yet been discovered. By its coherency clay retains humidity; on which perhaps its chief power of promoting vegetation depends.

Dr Black observes, that clay, when mixed with a large proportion of water, and kneaded a little, becomes a remarkable ductile adhesive mass, which is not easily dissolved in more water, and to render it thin and fluid requires great trouble. Hence it is employed for confining large quantities of water, as in making canals and dykes: but the soil must either contain a great quantity of clay naturally, or some quantity of it must be spread on the bottom; or the water itself must deposit a quantity of clay sufficient to render it tight. Hence also we see the bad effects of allowing cattle to tread much in clay-grounds when wet; for the clay is reduced to such an adhesive mass as not to admit the roots to penetrate the soil; or the water to enter to the roots.

Clay is used in the refining of sugar; for which no other property is requisite than that it may not dry too soon: but that species used in fulling must, if we were to judge *a priori*, besides the fineness of its par-

ticles, be of a dry nature, or such as attracts oils; tho' this quality perhaps may not be found in all those clays that are now employed in the business. According to Fabroni, the pure white clay being calcined in a strong heat, acquires a phosphorescent quality.

CLAY, a town of Norfolk in England, seated on an arm of the sea between two rivers, in E. Long. 0. 30. N. Lat. 47. 28.

CLAY-Lands, those abounding with clay, whether black, blue, yellow, white, &c. of which the black and the yellow are the best for corn.

All clay-soils are apt to chill the plants growing on them in moist seasons, as they retain too much water: in dry seasons, on the contrary, they turn hard and choke the plants. Their natural produce is weeds, goose-grass, large daisies, thistles, docks, poppies, &c. Some clay-soils will bear clover and rye-grass; and, if well manured, will produce the best grain: they hold manure the best of all lands; and the most proper for them are horse-dung, pigeon's dung, some kinds of marle, folding of sheep, malt-dust, ashes, chalk, lime, foot, &c.

CLAYTON (Dr Robert), a prelate of great learning, of distinguished worth and probity, and a respectable member of the Royal and Antiquarian Societies at London, was advanced to the bishopric of Killala, Jan. 23. 1729; translated to the see of Cork, Dec. 19. 1735; to that of Clogher, Aug. 26. 1745; and died much lamented, Feb. 25. 1758. His publications are, 1. A Letter in the Philosophical Transactions, n° 461, p. 813. giving an account of a Frenchman 70 years old (at Inishanan, in his diocese of Corke), who said he gave suck to a child. 2. The Chronology of the Hebrew Bible vindicated, &c. 1751, 4to.—3. An impartial Inquiry into the Time of the Coming of the Messiah; 1751, 8vo.—4. An Essay on Spirit, 1751, 8vo.—5. A Vindication of the Histories of the Old and New Testament, in Answer to the Objections of the late lord Bolingbroke: in Two Letters to a young Nobleman, 1752, 8vo, reprinted in 1753.—6. A defence of the Essay on Spirit, with Remarks on the several pretended Answers: and which may serve as an Antidote against all that shall ever appear against it, 1753, 8vo.—7. A Journal from Grand Cairo to Mount Sinai, and back again, translated from a Manuscript written by the Prefetto of Egypt, in Company with some Missionaries *de propaganda fide* at Grand Cairo: to which are added, Remarks on the Origin of Hieroglyphics, and the Mythology of the ancient Heathens, 1753, 8vo, two editions 4to and 8vo. It was soon after this publication that his Lordship became (in March 1754) a fellow of the Society of Antiquaries.—8. Some Thoughts on Self love, Innate Ideas, Free-will, Taste, Sentiments, Liberty, and Necessity, &c. occasioned by reading Mr Hume's Works, and the short Treatise written in French by Lord Bolingbroke on Compassion, 1754, 8vo.—9. A Vindication of the Histories of the Old and New Testament, Part II. Adorned with several Explanatory Cuts, 1754, 8vo.—10. Letters between the bishop of Clogher and Mr William Penn, concerning Baptism, 1755, 8vo.—11. A Speech made in the House of Lords in Ireland, on Monday, Feb. 2. 1756, for omitting the Ni-

Clay.
Clayton.

Claytonia cene and Athanasian Creeds out of the Liturgy, &c. 1756, 8vo.—12. A Vindication, part III. 1758, 8vo. The three parts of the "Vindication, with the Essay on Spirit, were reprinted by Mr Bowyer, in one vol. 8vo, 1759; with some additional notes, and an index of texts of scripture illustrated or explained.

CLAYTONIA, in botany: A genus of the monogynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 13th order, *Succulentæ*. The calyx is bivalved; the corolla pentapetalous; the stigma trifid; the capsule trivalved, unilocular, and trispermous. There are two species, natives of America. They are very low herbaceous plants, with white flowers; and are possessed of no remarkable property.

CLAZOMENÆ-ARUM, (Herodotus, Strabo, Vel-leius, Pliny); *Clazomena, æ*, (Mela); one of the twelve ancient cities of Ionia. The country of An-axagoras; situated in the neighbourhood of Colophon. The city was small, its port on the N. N. W. side of the island. Traces of the walls, Dr Chandler in-forms us, are found by the sea, and in a hill are vesti-ges of a theatre. Three or four trees grow on it; and by one is a cave hewn in the rock, and affording water. A vaulted room with a chimney at one end, and a ho-vel or two made with stones piled, are all the present structures; and these are chiefly frequented by fisher-men and by persons employed to watch and to drive away birds when the grain ripens. Referring to this confined situation of Clazomenæ, a famous sophist, when importuned to adorn his native city by re-siding in it rather than at Smyrna, replied, *The night-ingale refuses to sing in a cage.*

CLEANTHES, a stoic philosopher, disciple of Zeno, flourished 240 years before Christ. He main-tained himself in the day by working in the night: be-ing questioned by the magistrates how he subsisted, he brought a woman for whom he kneaded bread, and a gardener for whom he drew water; and refused a pre-sent from them. He composed several works, of which there are now only a few fragments remaining.

CLEAR, as a naval term, is variously applied to the weather, the sea-coasts, cordage, navigation, &c. The weather is said to be clear when it is fair and open, as opposed to cloudy or foggy. The sea-coast is called clear when the navigation is not interrupted, or rendered dangerous by rocks, sands, or breakers, &c. It is expressed of cordage, cables, &c. when they are unembarrassed or disentangled, so as to be ready for immediate service. It is usually opposed to *foul* in all these senses.

CLEARCHUS, a tyrant of Heraclea in Pontus, who was killed by Chion and Leonidas, Plato's pu-pils, during the celebration of the festivals of Bacchus. He had enjoyed the sovereign power during 12 years. A Lacedæmonian sent to quiet the Byzantines. He was recalled, but refused to obey, and fled to Cyrus the younger, who made him captain of 13,000 Greek soldiers. He obtained a victory over Artaxerxes; who was so enraged at the defeat, that when Clearchus fell into his hands by the treachery of Tissaphernes, he put him immediately to death.

CLEATS, in naval affairs, pieces of wood having one or two projecting ends whereby to fasten the ropes: some of them are fastened to the shrouds below

for this purpose, and others nailed to different places of the ship's deck or sides.

CLECHE, in heraldry, a kind of cross, charged with another cross of the same figure, but of the colour of the field.

CLEDGE, among miners, denotes the upper stratum of fuller's earth.

CLEDONISM, CLEDONISMUS, a kind of divina-tion, in use among the ancients. The word is formed from *κλῆδων*, which signifies two things, *rumor* "a report," and *avis* "a bird." In the first sense, cle-donism should denote a kind of divination drawn from words occasionally uttered. Cicero observes, that the Pythagoreans made observation not only of the words of the gods, but of those of men; and accordingly be-lieved the pronouncing of certain words, v. g. *incen-dium*, at a meal, very unhappy. Thus, instead of prison, they used the word *domicilium*; and to avoid *erinnys*, furies, said *eumenides*. In the second sense, *clledonism* should seem a divination drawn from birds; the same with *ornithomantia*.

CLEEVERS, in botany. See *GALIUM*.

CLEF, or CLIFF, in music, derived from the La-tin word *clavis*, a *key*: because by it is expressed the fundamental sound in the diatonic scale, which re-quires a determined succession of tones or semitones, whether major or minor, peculiar to the note from whence we set out, and resulting from its position in the scale. Hence, as it opens a way to this succe-sion, and discovers it, the technical term *key* is used with great propriety. But clefs rather point out the position of different musical parts in the general system, and the relations which they bear one to an-other.

A clef, says Rousseau, is a character in music placed at the beginning of a stave, to determine the degree of elevation occupied by that stave in the general claviary or system, and to point out the names of all the notes which it contains in the line of that clef.

Anciently the letters by which the notes of the ga-mut had been signified were called *clefs*. Thus the let-ter A was the clef of the note *la*, C the clef of *ut*, E the clef of *mi*, &c. In proportion as the system was extended, the embarrassment and superfluity of this multitude of clefs were felt.

Gui d'Arezzo, who had inverted them, marked a letter or clef at the beginning of each line in the stave; for as yet he had placed no notes in the spaces. In process of time they marked no more than one of the seven clefs at the beginning of one of the lines only; and this was sufficient to fix the position of all the rest, according to their natural order: at last, of these seven lines or clefs they selected four, which were called *claves signatæ*, or *discriminating clefs*; because they satisfied themselves with marking one of them upon one of the lines, from which the powers of all the o-thers might be recognized. Presently afterwards they even retrenched one of these four, viz. the gamma, of which they made use to mark the *sol* below, that is to say, the hypoproslambanomena added to the system of the Greeks.

In reality Kircher asserts, that if we understood the characters in which ancient music was written, and ex-aminated minutely the forms of our clefs, we should find that each of them represents the letter a little altered in its form,

Cleche
||
Clef.

Clef. form, by which the note was originally named. Thus the clef of *sol* was originally a G, the clef of *ut* a C, and the clef of *fa* an F.

Plate CXXVIII. fig. 9. We have then three clefs, one a fifth above the other: the clef of F, or *fa*, which is the lowest; the clef of *ut*, or C, which is a fifth above the former; and the clef of *sol* or G, which is a fifth above that of *ut*. These clefs, both as marked by foreigners and in Britain, may be seen in art. 170 of Music; upon which it is necessary to remark, that by a remain of ancient practice, the clef is always placed upon a line, and never in a space. It deserves notice, that the clef of *fa* is marked in three different manners: one in music which is printed; another in music which is written or engraven; and a third in the full harmony of the chorus.

By adding four lines above the clef of *sol*, and three lines beneath the clef of *fa*, which gives both above and below the greatest extent of permanent or established lines, it appears, that the whole scale of notes which can be placed upon the gradations relative to these clefs amounts to 24; that is to say, three octaves and a fourth from the F, or *fa*, which is found beneath the first line, to the *fi*, or B, which is found above the last, and all this together forms what we call the *general claviary*; from whence we may judge, that this compass has, for a long time, constituted the extent of the system. But as at present it is continually acquiring new degrees, as well above as below, the degrees are marked by leger lines, which are added above or below as occasion requires.

Instead of joining all the lines, as has been done by Rousseau in his Dictionary (plate A, fig. 5.), to mark the relation which one clef bears to another, they separate them five by five; because it is pretty nearly within the degrees to which the compass of ordinary voices extends. This collection of five lines is called a *stave*; and in these they place a clef, to determine the names of the notes, the positions of semitones, and to show what station the stave occupies in the claviary or general scale.

In whatever manner we take five successive lines in the claviary, we shall find one clef comprehended; nay, sometimes two; in which case one may be retrenched as useless. Custom has even prescribed which of the two should be retrenched, and which retained; it is this likewise which has determined the number of positions assigned to each clef.

If I form a stave of the first five lines in the claviary, beginning from below, I find the clef of *fa* in the fourth line. This then is one position of the clef, and this position evidently relates to the lowest note; thus likewise it is that of the bass clef.

If I wish to gain a third in ascent, I must add a line above; I must then obliterate one below, otherwise the stave will contain more than five lines. The clef of *fa* then is found transferred from the fourth to the third, and the clef of *ut* is likewise found upon the fifth; but as two clefs are useless, they retrench here that of *ut*. It is evident, that the stave of this clef is a third higher than the former.

By throwing away still one line below to gain another above, we have a third kind of stave, where the clef of *fa* will be found upon the second line, and that of *ut* upon the fourth. Here we leave out the clef of

fa, and retain that of *ut*. We have now gained another third above, and lost it below.

By continuing these alterations from line to line, we pass successively through four different positions of the clef of *ut*. Having arrived at that of *sol*, we find it placed upon the second line, and then upon the first. This position includes the five highest lines, and gives the sharpest diapason which the clefs can signify.

The reader may see in Rousseau's Musical Dictionary, Plate A. fig. 5. this succession of clefs from the lowest to the highest; which in all constitutes eight staves, clefs, or different positions of clefs.

Whatever may be the character and genius of any voice or instrument, if its extent above or below does not surpass that of the general claviary, in this number may be found a station and a clef suitable to it; and there are, in reality, clefs determined for all the parts in music. If the extent of a part is very considerable, so that the number of lines necessary to be added above or below may become inconvenient, the clef is then changed in the course of the music. It may be plainly perceived by the figure, what clef it is necessary to choose, for raising or depressing any part, under whatever clef it may be actually placed.

It will likewise appear, that, in order to adjust one clef to another, both must be compared by the general claviary, by means of which we may determine what every note under one of the clefs is with respect to the other. It is by this exercise repeated that we acquire the habit of reading with ease all the parts.

From this manœuvre it follows, that we may place whatever note we please of the gamut upon any line or space whatever of the stave, since we have the choice of eight different positions, which is equal to the number of notes in the octave. Thus you may mark a whole tune upon the same line, by changing the clef at each gradation. The 7th fig. of the same plate in Rousseau's Musical Dictionary, to which we formerly referred, shows by the series of clefs the order of the notes, *re, fa, la, ut, mi, sol, si, re*, rising by thirds, although all placed upon the same line. The fig. following represents upon the order of the same clefs the note *ut*, which appears to descend by thirds upon all the lines of the stave; and further, which yet, by means of changing the clef, still preserves its unison. It is upon such expamples as this, that scholars ought to exercise themselves, in order to understand at the first glance the powers of all the clefs, and their simultaneous effect.

There are two of their positions, viz. the clef of *sol* upon the first line, and that of *fa* upon the third, which seem daily to fall more and more into desuetude. The first of these may seem less necessary, because it produces nothing but a position entirely similar to that of *fa* upon the fourth line, from which however it differs by two octaves. As to the clef of *fa*, it is plain, that in removing it entirely from the third line, we shall no longer have any equivalent position, and that the composition of the claviary, which is at present complete, will by these means become defective.

Thus much for Rousseau's account of clefs. He proceeds to explain their transposition; but as this would render

Cleft
||
Clemency.

render the present article too long and intricate, we remit the curious to his *Musical Dictionary*, vol. 1. page 162. See also *Malcom's Dissertation on Music*.

CLEFT, in a general sense, is a space made by the separation of parts. Green timber is very apt to split and cleave in several places, after it is wrought into form; and these cracks in it are very disagreeable to the sight. The common method of the country carpenters is to fill up these cracks with a mixture of grease and saw-dust; but the neatest way of all is, the soaking both sides well with the fat of beef-broth, and then dipping pieces of sponge into the same broth, and filling up all the cracks with them: they swell out so as to fill the whole crack; and accommodate themselves so well to it, that the deficiency is hardly seen.

CLEFTS, or *Cracks*, in farriery, appear on the bought of the pasterns, and are caused by a sharp and malignant humour. See *FARRIERY*, sect. xxxiv.

CLEMA, in antiquity, a twig of the vine, which serves as a badge of the Centurion's office.

CLEMATIS, VIRGIN'S-BOWER: A genus of the polygynia order, belonging to the polyandria class of plants; and in the natural method ranking under the 26th order, *Multiflorae*. There is no calyx; the petals are four, rarely five; the seeds have a train. There are twelve species; all of which, except two, are shrubby climbing plants, very hardy, and adorned with quadrupetalous flowers of red, blue, purple, white, and greenish colours. They are very easily propagated by layers or cuttings. The *vitis alba*, one of the species, is very acrid to the taste, and without any smell. It is frequently used as a caustic, and for cleaning old ulcers. The root is said to be purgative. The leaves of all the species bruised and applied to the skin, burn it into carbuncles as in the plague; and if applied to the nostrils in a sultry day immediately after being cropped, will cause the same uneasy sensation as a flame applied to that part would occasion. Hence the title of *flammula*, or "little flame," by which this genus of plants was formerly distinguished.

CLEMENCY, denotes much the same with mercy; and implies a remission of severity towards offenders. The term is most generally used in speaking of the forgiveness exercised by princes or persons of high authority. It is the result, indeed, of a disposition which ought to be cultivated by all ranks, though its effects cannot be equally conspicuous or extensive. In praise of clemency joined with power, it is observed, that it is not only the privilege, the honour, and the duty of a prince, but it is also his security, and better than all his garrisons, forts, and guards, to preserve himself and his dominions in safety: That prince is truly royal, who masters himself; looks upon all injuries as below him; and governs by equity and reason, not by passion or caprice. In illustration of this subject, the following examples are selected out of many recorded in history.

Sueton, c. 9.

1. Two patricians having conspired against Titus the Roman emperor, were discovered, convicted, and sentenced to death by the senate: but the good-natured prince sent for them, and in private admonished them, that in vain they aspired to the empire, which was given by destiny; exhorting them to be satisfied with the rank in which by Providence they had been

placed, and offering them any thing else which was in his power to grant. At the same time he dispatched a messenger to the mother of one of them, who was then at a great distance, and under deep concern about the fate of her son, to assure her, that her son was not only alive, but forgiven.

2. Licinius having raised a numerous army, Zosimus says 130,000 men, endeavoured to wrest the government out of the hands of his brother-in-law Constantine the emperor. But his army being defeated, Licinius fled with what forces he could rally to Nicomedia, whither Constantine pursued him, and immediately invested the place: but on the second day of the siege, the emperor's sister intreating him, with a flood of tears, by the tenderness he had ever shown for her, to forgive her husband, and grant him at least his life, he was prevailed upon to comply with her request; and the next day, Licinius, finding no means of making his escape, presented himself before the conqueror, and throwing himself at his feet, yielded to him the purple and the other ensigns of sovereignty. Constantine received him in a very friendly manner, entertained him at his table, and afterwards sent him to Thessalonica, assuring him, that he should live unmolested so long as he raised no new disturbances.

3. The council of thirty, established at Athens by Lyfander, committed the most execrable cruelties. Upon pretence of restraining the multitude within their duty, and to prevent seditions, they had caused guards to be assigned them, had armed 3000 of the citizens for that purpose, and at the same time disarmed all the rest. The whole city was in the utmost terror and dismay. Whoever opposed their injustice and violence fell a victim to their resentment. Riches were a crime that never failed of drawing a sentence upon their owners, always followed with death and the confiscation of estates; which the thirty tyrants divided amongst themselves. They put more people to death (says Xenophon) in eight months of a peace, than their enemies had done in a war of thirty years. All the citizens of any consideration in Athens, and who retained a love of liberty, quitted a place reduced to so hard and shameful a slavery, and sought elsewhere an asylum and retreat, where they might live in safety. At the head of these was Thrasylbulus, a person of extraordinary merit, and who beheld with the most lively affliction the miseries of his country.

The Lacedaemonians had the inhumanity to endeavour to deprive those unhappy fugitives of this last resource. They published an edict to prohibit the cities of Greece from giving them refuge, decreed that they should be delivered up to the thirty tyrants, and condemned all such as should contravene the execution of this edict to pay a fine of five talents. Only two cities rejected with disdain so unjust an ordinance, Megara and Thebes; the latter of which made a decree to punish all persons whatsoever that should see an Athenian attacked by his enemies without doing his utmost to assist him. Lysias, an orator of Syracuse who had been banished by the thirty, raised 500 soldiers at his own expence, and sent them to the aid of the common country of Eloquence. Thrasylbulus lost no time. After having taken Phytia, a small fort in Attica, he marched to the Piræus, of which he made himself master. The thirty flew thither with their troops,

Clemency. troops, and a battle ensued. The tyrants were overthrown. Critias, the most savage of them all, was killed on the spot: and as the army was taking to flight, Thrasybulus cried out, "Wherefore do you fly from me as from a victor, rather than assist me as the avenger of your liberty? We are not enemies, but fellow-citizens; nor have we declared war against the city, but against the thirty tyrants." He continued with bidding them to remember, that they had the same origin, country, laws, and religion: he exhorted them to compassionate their exiled brethren, to restore their country to them, and resume their own liberty. This discourse had the desired effect. The army, upon their return to Athens, expelled the thirty, and substituted ten persons to govern in their room, whose conduct proved no better than theirs: but king Pausanias, moved with compassion for the deplorable condition to which a city, once so flourishing, was reduced, had the generosity to favour the Athenians in secret, and at length obtained a peace for them. It was sealed with the blood of the tyrants, who having taken arms to reinstate themselves in the government, were all put to the sword, and left Athens in the full possession of its liberty. All the exiles were recalled. Thrasybulus at that time proposed the celebrated amnesty, by which the citizens engaged upon oath, that all past transactions should be buried in oblivion. The government was re-established upon its ancient foot, the laws were restored to their pristine vigour, and magistrates elected with the usual form.

This (says Rollin) is one of the finest events in ancient history, worthy the Athenian clemency and benevolence, and has served as a model to successive ages in all good governments. Never had tyranny been more cruel and bloody than that the Athenians had lately thrown off. Every house was in mourning, every family bewailed the loss of some relation: it had been a series of public robbery and rapine, in which licence and impunity had authorised all manner of crimes. The people seemed to have a right to demand the blood of all accomplices in such notorious malversations, and even the interest of the state to authorise such a claim, that by exemplary severities such enormous crimes might be prevented for the future. But Thrasybulus rising above these sentiments, from the superiority of his more extensive genius, and the views of a more discerning and profound policy, foresaw, that by giving in to the punishment of the guilty, eternal seeds of discord and enmity would remain, to weaken the public by domestic divisions, when it was necessary to unite against the common enemy, and also occasion the loss to the state of a great number of citizens, who might render it important services from the view of making amends for past misbehaviour.

4. Such conduct, after great troubles in a state, has always seemed, with the ablest politicians, the most certain and ready means to restore the public peace and tranquillity. Cicero, when Rome was divided into two factions upon the occasion of Cæsar's death, who had been killed by the conspirators, calling to mind this celebrated amnesty, proposed, after the example of the Athenians, to bury all that had passed in eternal oblivion.

5. Cardinal Mazarine observed to Don Lewis de Haro, prime minister of Spain, that this gentle and humane

conduct in France had prevented the troubles and revolts of that kingdom from having any fatal consequences, and "that the king had not lost a foot of land by them to that day;" whereas "the inflexible severity of the Spaniards was the occasion that the subjects of that monarchy, whenever they threw off the mask, never returned to their obedience but by the force of arms; which sufficiently appears (says he) in the example of the Hollanders, who are in the peaceable possession of many provinces, that not an age ago were the patrimony of the king of Spain."

6. Leonidas the Lacedemonian having, with 300 *Herod.* men only, disputed the pass of Thermopylæ against the whole army of Xerxes; and being killed in that engagement, Xerxes, by the advice of Mardonius one of his generals, caused his dead body to be hung upon a gallows, making thereby the intended dishonour of his enemy his own immortal shame. But some time after, Xerxes being defeated, and Mardonius slain, one of the principal citizens of Ægina came and addressed himself to Pausanias, desiring him to avenge the indignity that Mardonius and Xerxes had shown to Leonidas, by treating Mardonius's body after the same manner. As a farther motive for doing so, he added, that by thus satisfying the manes of those who were killed at Thermopylæ, he would be sure to immortalize his own name throughout all Greece, and make his memory precious to the latest posterity. "Carry thy base counsels elsewhere (replied Pausanias); thou must have a very wrong notion of true glory to imagine, that the way for me to acquire it is to resemble the barbarians. If the esteem of the people of Ægina is not to be purchased but by such a proceeding, I shall be content with preserving that of the Lacedemonians only, amongst whom the base and ungenerous pleasure of revenge is never put in competition with that of showing clemency and moderation to their enemies, especially after their death. As for the souls of my departed countrymen, they are sufficiently avenged by the death of the many thousand Persians slain upon the spot in the last engagement."

CLEMENS ROMANUS, bishop of Rome, where he is said to have been born; and to have been fellow-labourer with St Peter and St Paul. We have nothing remaining of his works that is clearly genuine, excepting one epistle, written to quiet some disturbances in the church of Corinth; which, next to holy writ, is esteemed one of the most valuable remains of ecclesiastical antiquity.

CLEMENS Alexandrinus, so called to distinguish him from the former, was an eminent father of the church, who flourished at the end of the second and beginning of the third centuries. He was the scholar of Pantaenus, and the instructor of Origen. The best edition of his works is that in 2 vols folio, published in 1715, by archbishop Potter.

CLEMENT V. (pope), the first who made a public sale of indulgences. He transplanted the holy see to Avignon in France; greatly contributed to the suppression of the knights templars; and was author of a compilation of the decrees of the general councils of Vienna, styled *Clementines*. He died in 1314.

CLEMENT VII. (Julius de Medicis), pope, memorable for his refusing to divorce Catharine of Arragon from Henry VIII.; and for the bull he published upon

Clemency
Clement.

Clement
||
Clenard.

upon the king's marriage with Anne Boleyn; which, according to the Romish authors, lost him England. He died in 1534.

CLEMENT XIV. (Francis Laurentius Ganganelli), the late pope, was born at St Angelo in the duchy of Urbino, in October 1705; and chosen pope, though not yet a bishop, in 1769; at which time the see of Rome was involved in a most disagreeable and dangerous contest with the house of Bourbon. His reign was rendered troublesome by the collision of parties on the affairs of the Jesuits; and it is pretended that his latter days were embittered by the apprehensions of poison. Though this report was probably apocryphal, it is said that he often complained of the heavy burden which he was obliged to bear; and regretted, with great sensibility, the loss of that tranquillity which he enjoyed in his retirement when only a simple Franciscan. He was, however, fortunate in having an opportunity, by a single act, to distinguish a short administration of five years in such a manner as will ever prevent its sinking into obscurity. His death was immediately attributed to poison, as if an old man of 70, loaded with infirmities and disorders, could not quit the world without violence. His proceedings against the Jesuits furnished a plausible pretence for this charge; and the malevolence of their enemies embellished it with circumstances. It even seems as if the ministers of those powers who had procured their dissolution did not think it beneath them to countenance the report; as if falsehood was necessary to prevent the revival of a body which had already sunk, in its full strength, under the weight of real misconduct. The charge was the more ridiculous, as the pontiff had undergone a long and painful illness, which originally proceeded from a suppression of urine, to which he was subject; yet the report was propagated with the greatest industry; and though the French and Spanish ministers were present at the opening of his body, the most horrible circumstances were published relative to that operation. It was confidently told that the head fell off from the body, and that the stench poisoned and killed the operators. It availed but little that the operators showed themselves alive and in good health, and that the surgeons and physicians proved the falsehood of every part of the report. Clement XIV. appears to have been a man of a virtuous character, and possessed of considerable abilities. He died much regretted by his subjects.

CLEMENTINE, a term used among the Augustines, who apply it to a person who, after having been nine years a superior, ceases to be so, and becomes a private monk, under the command of a superior. The word has its rise hence, that pope Clement, by a bull, prohibited any superior among the Augustines from continuing above nine years in his office.

CLEMENTINES, in the canon law, are the constitutions of pope Clement V. and the canons of the council of Vienne.

CLENARD (Nicholas), a celebrated grammarian in the 16th century, was born at Dieft; and after having taught humanity at Louvain, travelled into France, Spain, Portugal and Africa. He wrote in Latin,
1. Letters relating to his Travels, which are very curious and scarce. 2. A Greek Grammar, which has

been revised and corrected by many grammarians; and other works. He died at Grenoble in 1542.

CLEOBIS and BITON, two youths, sons of Cydippe the priestess of Juno at Argos. When oxen could not be procured to draw their mother's chariot to the temple of Juno, they put themselves under the yoke, and drew it 45 stadia to the temple, amidst the acclamations of the multitude, who congratulated the mother on account of the piety of her sons. Cydippe intreated the goddesses to reward the piety of her sons with the best gift that could be granted to a mortal. They went to rest and awoke no more; and by this the goddesses showed that death is the only true happy event that can happen to a man. The Argives raised them statues at Delphi.

CLEOBULUS, son of Evagoras, and one of the Grecian sages; he was valiant, a lover of learning, and an enemy to vice. Flourished about 560 years before Christ.

CLEOMBROTUS, a king of Sparta, son of Anaxandrides. He was deterred from building a wall across the isthmus of Corinth against the approach of the Persians, by an eclipse of the sun. He died in the 75th Olympiad, and was succeeded by Plistarchus, son of Leonidas, a minor.

CLEOMBROTUS II. son of Pausanias king of Sparta, after his brother Agesipolis I. He made war against the Bœotians; and lest he should be suspected of treacherous communications with Epaminondas, he gave that general battle at Leuctra, in a very disadvantageous place. He was killed in the engagement, and his army destroyed, in the year of Rome 382.

CLEOMBROTUS III. a son-in-law of Leonidas king of Sparta, who for a while usurped the kingdom after the expulsion of his father-in-law. When Leonidas was recalled, Cleombrotus was banished, and his wife, Chelonis, who had accompanied her father, now accompanied her husband in his exile.

CLEOME, in botany: A genus of the siliquosa order, belonging to the tetradynamia class of plants; and in the natural method ranking under the 25th order, *Putamineæ*. There are three nectariferous glands, one at each sinus of the calyx except the lowest; the petals all rising upwards; the siliqua unilocular and bivalved. There are 15 species; all of them, except two, natives of warm climates. They are herbaceous plants rising from one to two feet high; and are adorned with flowers of various colours, as red, yellow, flesh colour, &c. They are propagated by seeds, and require no other care than what is common to other exotics which are natives of warm countries.

CLEOMENES, king of Sparta, conquered the Argives and freed Athens from the tyranny of the Pisistratidæ. By bribing the oracle he pronounced Demaratus, his colleague on the throne, illegitimate, because he refused to punish the people of Ægina, who had deserted the Greeks. He killed himself in a fit of madness.

CLEOMENES II. succeeded his brother Agesipolis II. He reigned 34 years in the greatest tranquillity, and was father to Acrotatus and Cleonymus. He was succeeded by Areus I. son of Acrotatus.

CLEOMENES III. succeeded his father Leonidas. He was of an enterprising spirit, and resolved to restore the ancient discipline of Lycurgus in its full force.

Cleobis
and Biton
||
Cleomenes

Cleon force. He killed the Ephori, and removed by poison his royal colleague Eurydamides, and made his own brother Euclidas king, against the laws of the state, which forbade more than one of the same family to sit on the throne. He made war against the Achæans, and attempted to destroy the Achæan league. Aratus the general of the Achæans, who supposed himself inferior to his enemy, called Antigonus to his assistance; and Cleomenes, when he had fought the unfortunate battle of Sellasia, retired into Egypt to the court of Ptolemy Evergetes, where his wife and children had gone before him. Ptolemy received him with great cordiality; but his successor, weak and suspicious, soon expressed his jealousy of this noble stranger, and imprisoned him. Cleomenes killed himself, and his body was flayed and exposed on a cross, 140 Olymp.

CLEON, the name of several noted men of antiquity. 1. Of an Athenian, who, though originally a tanner, became general of the armies of the state by his intrigues and eloquence. He took Thoron in Thrace, and was killed at Amphipolis in a battle with Brasidas the Spartan general, Olymp. 89th. 2. A general of Messenia, who disputed with Aristodemus for the sovereignty. 3. A statuary. 4. A poet who wrote a poem on the Argonauts. 5. An orator of Halicarnassus who composed an oration for Lysander, in which he intimated the propriety of making the kingdom of Sparta elective. 6. A Magnesian who wrote some commentaries, in which he speaks of portentous events, &c.

CLEONÆ (anc. geog.), a town of Argolis, above Mycenæ, on the road which leads from Argos to Corinth; standing on an eminence, on every side occupied by houses. In the forest near this town was slain by Hercules the huge lion (Sil. Italicus, Seneca). *Cleonaus* the epithet; *Cleonaum Sidus*, the lion.—Another *Cleona* on Mount Athos in Chalcidice.

CLEOPATRA, the celebrated queen of Egypt, was daughter of Ptolemy Auletes. By her extraordinary beauty, she subdued the two renowned Roman generals Julius Cæsar and Marc Antony: the latter of whom, it is thought, lost the empire of Rome by his attachment to her. At length, Marc Antony being subdued by Octavius Cæsar, she tried the force of her declining charms upon the conqueror, but in vain; upon which, expecting no mercy from him, she poisoned herself, 30 years before Christ. According to some authors, she was the restorer of the Alexandrian library, to which she added that of Pergamos; and it is said, that she studied philosophy to console her for the absence of Antony. With her death ended the family of the Ptolemies in Egypt, after it had reigned from the death of Alexander 294 years: for Egypt, after this, was reduced to a Roman province; in which dependence it remained till it was taken from them by the Saracens, A. D. 641.

CLEOPATRIS (anc. geog.), a town of Egypt, on the Arabian Gulf. See **ARSINOË**. Now said to be *Suez*, situated at the bottom of the gulf of the Red Sea. E. Long. 34. 30. N. Lat. 30. 0.

CLEOSTRATUS, a celebrated astronomer born in Tenedos, was, according to Pliny, the first who discovered the signs of the Zodiac; others say, that he only discovered the signs Aries and Sagittarius. He also corrected the errors of the Grecian year about the 306th before Christ.

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CLEPSYDRA, an instrument or machine serving to measure time by the fall of a certain quantity of water. Clepsydra,
Clerc.

The word comes from *κλεψύδρα*, *condo*, *ἵδρω*, *aqua*, "water"; though there have likewise been clepsydræ made with mercury.

The Egyptians, by this machine, measured the course of the sun. Tycho Brahe, in our days, made use of it to measure the motion of the stars, &c. and Dudley used the same contrivance in making all his maritime observations. The use of clepsydræ is very ancient: they were invented in Egypt under the Ptolemies; as were also sun-dials. Their use was chiefly in the winter; the sun-dials served in the summer. They had two great defects; the one, that the water ran out with a greater or less facility, as the air was more or less dense; the other, that the water ran more readily at the beginning than towards the conclusion. M. Amontons has invented a clepsydra free from both these inconveniences; and which has these three grand advantages, of serving the ordinary purpose of clocks, of serving in navigation for the discovery of the longitude, and of measuring the motion of the arteries.

Construction of a CLEPSYDRA. To divide any cylindric vessel into parts to be emptied in each division of time; the time wherein the whole, and that wherein any part, is to be evacuated, being given.

Suppose, *v. gr.* a cylindric vessel, whose charge of water flows out in twelve hours, were required to be divided into parts to be evacuated each hour. 1. As the part of time 1 is to the whole time 12; so is the same time 12 to a fourth proportional, 144. 2. Divide the altitude of the vessels into 144 equal parts: here the last will fall to the last hour; the three next above to the last part but one; the five next to the tenth hour, &c.; lastly, the 23 last to the first hour. For since the times increase in the series of the natural numbers 1, 2, 3, 4, 5, &c. and the altitudes, if the numeration be in retrograde order from the twelfth hour, increase in the series of the unequal numbers 1, 3, 5, 7, 9, &c. the altitude, computed from the twelfth hour, will be as the squares of the times 1, 4, 9, 16, 25, &c. therefore the square of the whole time 144 comprehends all the parts of the altitude of the vessel to be evacuated. But a third proportional to 1 and 12 is the square of 12, and consequently it is the number of equal parts into which the altitude is to be divided, to be distributed according to the series of the unequal numbers, through the equal intervals of hours. Since in lieu of parts of the same vessel, other less vessels equal thereto may be substituted; the altitude of a vessel emptied in a given space of time being given, the altitude of another vessel to be emptied in a given time may be found; *viz.* by making the altitudes as the squares of the times. For a further description, with a figure, see **HYDROSTATICS**.

CLERC (John le), a most celebrated writer and universal scholar, born at Geneva in 1657. After he had passed through the usual course of study at Geneva, and had lost his father in 1676, he went to France in 1678; but returning the year after, he was ordained with the general applause of all his examiners. In 1682, le Clerc visited England with a view to learning the language. He preached several times in the French churches

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Clerc.

churches in London, and visited several bishops and men of learning: but the smoky air of the town not agreeing with his lungs, he returned to Holland within the year, where he at length settled. He preached before a synod held at Rotterdam by the remonstrants in 1684; and was admitted professor of philosophy, polite literature, and the Hebrew tongue, in their school at Amsterdam. The remainder of his life affords nothing but the history of his works, and of the controversies he was engaged in: but these would lead into too extensive a detail. He continued to read regular lectures; and because there was no single author full enough for his purpose, he drew up and published his *Logic*, *Ontology*, *Pneumatology*, and *Natural Philosophy*. He published *Ars Critica*; a Commentary on the Old Testament; a Compendium of Universal History; an Ecclesiastical History of the two first Centuries; a French Translation of the New Testament, &c. In 1686, he began, jointly with M. de la Crose, his *Bibliothèque Universelle et Historique*, in imitation of other literary journals; which was continued to the year 1693, inclusive, in 26 vols. In 1703, he began his *Bibliothèque Choisie*, and continued it to 1714, and then commenced another work on the same plan called *Bibliothèque Ancienne et Moderne*, which he continued to the year 1728; all of them justly deemed excellent stores of useful knowledge. In 1728, he was seized with a palsy and fever; and after spending the last six years of his life with little or no understanding, died in 1736.

CLERC (John le), called *Chevalier*, an eminent historical painter, was born at Nanci in 1587, but studied in Italy, where he resided for twenty years; and was a disciple of Carlo Venetiano, with whom he worked a long time, and whose style he so effectually studied and imitated, that several of the pictures which were finished by le Clerc were taken for the work of Venetiano. He was most highly esteemed at Venice for his extraordinary merit; and as a token of public respect, he was made a knight of St Mark. His freedom of hand was remarkable; he had a light pencil; and in his colouring he resembled his master. He died in 1633.

CLERC (Sebastien le), engraver and designer in ordinary to the French king, was born at Metz in 1637. After having learnt designing, he applied himself to mathematics, and was engineer to the marshal de la Ferté. He went to Paris in 1665, where he applied himself to designing and engraving with such success, that M. Colbert gave him a pension of 600 crowns. In 1672, he was admitted into the royal academy of painting and sculpture; and in 1680 was made professor of geometry and perspective in the same academy. He published, besides a great number of designs and prints, 1. A Treatise on theoretical and practical Geometry. 2. A Treatise on Architecture; and other works: and died in 1714.—He was an excellent artist, but chiefly in the petit style. His genius seldom exceeds the dimensions of six inches. Within those limits he could draw up 20,000 men with great dexterity. No artist except Callot and Della Bella could touch a small figure with so much spirit. His most esteemed prints are: 1. *The passion of our Saviour*, on 36 small plates, lengthwise, from his own compositions. The best impressions are without the borders. 2. The

miracle of the feeding five thousand, a middling-sized plate, lengthwise. In the first impressions, which are very rare, a town appears in the back-ground; in place of which a mountain is substituted in the common ones. 3. The elevation of the large stones used in building the front of the Louvre, a large plate, lengthwise. The first impressions are without the date 1677, which was afterwards added. 4. The academy of the sciences, a middling-sized plate, lengthwise. The first impressions are before the skeleton of the stag and tortoise were added. The second impressions are before the shadow was enlarged at the bottom, towards the right hand side of the print. Both these impressions are very scarce. The first is rarely met with. This print was copied for Chambers's Dictionary. 5. The May of the Gobelins, a middling-sized plate, lengthwise. The first impression is before the woman was introduced, who covers the wheel of the coach. 6. The four conquests, large plates, lengthwise, representing the taking of Tournay, the taking of Dovay, the defeat of the comte de Marfin, and the Switzerland alliance. 7. The battles of Alexander, from Le Brun, six small long plates, including the title, which represents the picture gallery at the Gobelins. The first impressions of the tent of Darius, which plate makes part of this set, is distinguished by the shoulder of the woman, who is seated in the front, being without the shadow, which was afterwards added; for which reason they are called the prints with the naked shoulder. 8. The entry of Alexander into Babylon, a middling-sized plate, lengthwise. In the first impressions, the face of Alexander is seen in profile; in the second, it is a three quarter face, and therefore called the print with the head turned.

CLERC (George le) count de Buffon, a celebrated naturalist, was born at Montbard, in Burgundy, the 7th of September 1707: his father was a counsellor of the parliament of Dijon, and the son was destined to the same office, if science had not drawn him away from the law. He studied at Dijon; and his eager activity, his acuteness, penetration, and robust constitution, fitted him to pursue business and pleasure with equal ardour. His early passion was for astronomy, and the young Le Clerc was never without Euclid in his pocket. At the age of twenty, he went with an English nobleman and his governor to Italy; but he overlooked the choicest remains of art, and, amidst the ruins of an elegant and luxurious people, he first felt the charms of natural history, whose zealous and successful admirer he afterwards proved. On his return to France, he fought, on some occasional quarrel, with an Englishman, whom he wounded, and was obliged to retire to Paris. He there translated Newton's Fluxions, from the Latin, and Hales's Statics from the English, into the French language. He afterwards came to England, at the age of twenty-five; and this journey concluded his travels: he staid here about three months. At the age of twenty-one, he succeeded to the estate of his mother, which was valued at about 300,000 livres (above 12,000 pounds sterling); and he was one of those whose easy or affluent circumstances urge on literary pursuits, and clear the path of some of its thorns. Perhaps this was the period of his retirement to Montbard, where he spent much time, and where his leisure was little interrupted: while in the capital, his

Clerc.

his

Cleric, his office of intendant of the king's garden and cabinet engaged much of his time. He loved much company, and was partial to the fair; but he loved glory more. He spent 14 hours every day in study; and, when we examine the extent of his knowledge, and the number of his works, we wonder at his having executed so much even in this time. At five in the morning he retired to a pavilion in his vast gardens, and he was then inaccessible. This was, as prince Henry of Prussia called it, the cradle of natural history; but she was indifferently accommodated. The walls were naked, an old writing-table, with pen, ink, and paper, and an elbow chair of black leather, were the only furniture of his study. His manuscripts were in a cabinet in another building, and he went occasionally from one to the other. The eras of Buffon's works are pretty well known. When each was finished, it was put aside, in order that he might forget it, and he then returned to it with the severity of a critic. He was anxious to have it perspicuous; and if those to whom he read his works hesitated a moment, he changed the passage. The works of others he at last read like Magliabechi, the titles, the contents, and the most interesting parts; but he read M. Necker's *Compte Rendu*, and the Administration of the Finances at length: he spoke of them also with no little enthusiasm. His favourite authors were Fenelon, Montesquieu, and Richardson.

M. de Buffon's conversation was unadorned, rarely animated, but sometimes very cheerful. He was exact in his dress, particularly in dressing his hair. He sat long at table, and then seemed at his ease. His conversation was, at this time, unembarrassed, and his guests had frequently occasion to notice some happy turn of phrase, or some deep reflection. His complaisance was very considerable: he loved praise, and even praised himself; but it was with so much frankness, and with so little contempt of others, that it was never disagreeable. Indeed, when we consider the extent of his reputation, the credit of his works, and the attention with which they were always received, we do not wonder that he was sensible of his own value. It would perhaps have displayed a stronger mind to have concealed it. His father lived to 93, and almost adored his son; his grandfather to 87; and the subject of the present article exceeded only 80. He died in April 1788. Fifty-six stones were found in his bladder; but if he had consented to the operation, he might probably have lived longer. One son remains; who near a high tower in the gardens of Montbard has placed a low column, with the following inscription:

Excelsæ Turri
Humilis Columna,
Parenti suo
Fil. Buffon.

CLERGY, a general name given to the body of ecclesiastics of the Christian church, in contradistinction to the laity. See **LAITY**.

The distinction of Christians into clergy and laity, was derived from the Jewish church, and adopted into the Christian by the apostles themselves: whenever any number of converts was made, as soon as they were capable of being formed into a congregation or church, a bishop or presbyter, with a deacon, were or-

dained to minister to them. Of the bishops, priests, and deacons, the clergy originally consisted; but in the third century, many inferior orders were appointed, as subservient to the office of deacon, such as **ACOLUTHISTS, READERS, &c.**

This venerable body of men being separate and set apart from the rest of the people, in order to attend the more closely to the service of Almighty God, have therefore large privileges allowed them by our municipal laws: and had formerly much greater, which were abridged at the time of the reformation, on account of the ill use which the Popish clergy had endeavoured to make of them. For, the laws having exempted them from almost every personal duty, they attempted a total exemption from every secular tie. But it is observed by Sir Edward Coke, that as the overflowing of waters doth many times make the river to lose its proper channel, so, in times past, ecclesiastical persons, seeking to extend their liberties beyond their due bounds, either lost, or enjoyed not, those which of right belonged to them. The personal exemptions do indeed for the most part continue: a clergyman cannot be compelled to serve on a jury, nor to appear at a court-leet, or view of frank-pledge, which almost every other person is obliged to do: but if a layman is summoned on a jury, and before the trial takes orders, he shall notwithstanding appear and be sworn. Neither can he be chosen to any temporal office, as bailiff, reeve, constable, or the like; in regard of his own continual attendance on the sacred function. During his attendance on divine service, he is privileged from arrests in civil suits. In cases also of felony, a clerk in orders shall have the benefit of his clergy, without being branded in the hand; and may likewise have it more than once: in both which particulars he is distinguished from a layman. But, as they have their privileges, so they have also their disabilities, on account of their spiritual avocations. Clergymen are incapable of sitting in the house of commons; and by statute 21 Hen. VIII. c. 13. are not in general allowed to take any lands or tenements to farm, upon pain of 10 l. per month, and total avoidance of the lease; nor, upon like pain, to keep any tap-house or brew-house; nor shall engage in any manner of trade, nor sell any merchandize, under forfeiture of the treble value. Which prohibition is consonant to the canon law.

Benefit of CLERGY, is an ancient privilege whereby one in orders claimed to be delivered to his ordinary to purge himself of felony.

After trial and conviction * of a criminal, the judgment of the court regularly follows, unless suspended or arrested by some intervening circumstances; of which the principal is *benefit of clergy*; a title of no small curiosity as well as use; and concerning which, therefore, it may not be improper to inquire, 1. Into its original, and the various mutations which this privilege of the clergy has sustained. 2. To what persons it is to be allowed at this day. 3. In what cases. 4. The consequences of allowing it.

1. Clergy, the *privilegium clericale*, or (in common speech) the benefit of clergy, had its original from the pious regard paid by Christian princes to the church in its infant state, and the ill use which the popish ecclesiastics soon made of that pious regard. The exemp-

Clergy.

tions which they granted to the church were principally of two kinds: 1. Exemptions of places consecrated to religious duties from criminal arrests; which was the foundation of sanctuaries. 2. Exemption of the persons of clergymen from criminal process before the secular judge in a few particular cases; which was the true original and meaning of the *privilegium clericale*.

But the clergy increasing in wealth, power, honour, number, and interest, soon began to set up for themselves; and that which they obtained by the favour of the civil government, they now claimed as their inherent right, and as a right of the highest nature, indefeasible, and *jure divino*. By their canons, therefore, and constitutions, they endeavoured at, and where they met with easy princes, obtained, a vast extension of those exemptions; as well in regard to the crimes themselves, of which the list became quite universal, as in regard to the persons exempted; among whom were at length comprehended, not only every little subordinate officer belonging to the church or clergy, but even many that were totally laymen.

In England, however, although the usurpations of the pope were very many and grievous, till Henry VIII. totally exterminated his supremacy, yet a total exemption of the clergy from secular jurisdiction could never be thoroughly effected, though often endeavoured by the clergy: and therefore, though the ancient *privilegium clericale* was in some capital cases, yet it was not universally allowed. And in those particular cases, the use was for the bishop or ordinary to demand his clerks to be remitted out of the king's courts as soon as they were indicted: concerning the allowance of which demand there was for many years a great uncertainty; till at length it was finally settled in the reign of Henry VI. that the prisoner should first be arraigned; and might either then claim his benefit of clergy by way of declinatory plea; or, after conviction, by way of arrest of judgment. This latter way is most usually practised, as it is more to the satisfaction of the court to have the crime previously ascertained by confession or the verdict of a jury; and also it is more advantageous to the prisoner himself, who may possibly be acquitted, and so need not the benefit of his clergy at all.

Originally the law was held that no man should be admitted to the benefit of clergy, but such as had the *habetum et tonsuram clericalem*. But, in process of time, a much wider and more comprehensive criterion was established; every one that could read (a great mark of learning in those days of ignorance and her sifter superstition) being accounted a clerk, or *clericus*, and allowed the benefit of clerkship, though neither initiated in clerkship, nor trimmed with the holy tonsure. But when learning, by means of the invention of printing, and other concurrent causes, began to be more generally disseminated than formerly; and reading was no longer a competent proof of clerkship, or being in holy orders; it was found that as many laymen as divines were admitted to the *privilegium clericale*: and therefore by statute 4 Henry VII. c. 13. a distinction was once more drawn between mere lay scholars and clerks that were really in orders. And, though it was thought reasonable still to mitigate the

severity of the law with regard to the former, yet they were not put upon the same footing with actual clergy; being subjected to a slight degree of punishment, and not allowed to claim the clerical privilege more than once. Accordingly the statute directs, that no person, once admitted to the benefit of clergy, shall be admitted thereto a second time, until he produces his orders: and in order to distinguish their persons, all laymen who are allowed this privilege, shall be burned with a hot-iron in the brawn of the left thumb. This distinction between learned laymen and real clerks in orders was abolished for a time by the statutes 28 Hen. VIII. c. 1. and 32 Hen. VIII. c. 3.; but is held to have been virtually restored by statute 1 Edw. VI. c. 12. which statute also enacts, that lords of parliament and peers of the realm may have the benefit of their peerage, equivalent to that of clergy, for the first offence (although they cannot read, and without being burnt in the hand), for all offences then clergyable to commoners, and also for the crimes of house-breaking, highway-robbery, horse-stealing, and robbing of churches.

After this burning, the laity, and before it the real clergy, were discharged from the sentence of the law in the king's courts, and delivered over to the ordinary, to be dealt with according to the ecclesiastical canons. Whereupon the ordinary, not satisfied with the proofs adduced in the profane secular court, let himself formerly to make a purgation of the offender by a new canonical trial; although he had been previously convicted by his country, or perhaps by his own confession. This trial was held before the bishop in person, or his deputy; and by a jury of twelve clerks: And there, first, the party himself was required to make oath of his own innocence: next, there was to be the oath of twelve compurgators, who swore they believed he spoke the truth: then, witnesses were to be examined upon oath, but on behalf of the prisoner only; and, lastly, the jury were to bring in their verdict upon oath, which usually acquitted the prisoner; otherwise, if a clerk, he was degraded, or put to penance. A learned judge in the beginning of last century, remarks with much indignation the vast complication of perjury and subornation of perjury in this solemn farce of a mock trial: the witnesses, the compurgators, and the jury, being all of them partakers in the guilt: the delinquent party also, though convicted in the clearest manner, and conscious of his own offence, yet was permitted, and almost compelled, to swear himself not guilty; nor was the good bishop himself, under whose countenance this scene was transacted, by any means exempt from a share of it. And yet, by this purgation, the party was restored to his credit, his liberty, his lands, and his capacity of purchasing afresh, and was entirely made a new and an innocent man.

This scandalous prostitution of oaths, and the forms of justice, in the almost constant acquittal of felonious clerks by purgation, was the occasion that, upon very heinous and notorious circumstances of guilt, temporal courts would not trust the ordinary with the trial of the offender, but delivered over to him the convicted clerk, *absque purgatione faciendo*: in which situation the clerk convicted could not make purgation; but was to continue in prison during life, and was incapable

Clergy.

Clergy. capable of acquiring any personal property, or receiving the profits of his lands, unless the king should please to pardon him. Both these courses were in some degree exceptionable; the latter perhaps being too rigid, as the former was productive of the most abandoned perjury. As therefore these mock trials took their rise from factious and popish tenets, tending to exempt one part of the nation from the general municipal law; it became high time, when the reformation was thoroughly established, to abolish so vain and impious a ceremony.

Accordingly the statute 18 Eliz. c. 7. enacts, that, for the avoiding such perjuries and abuses, after the offender has been allowed his clergy, he shall not be delivered to the ordinary as formerly; but, upon such allowance, and burning of the hand, he shall forthwith be enlarged and delivered out of prison; with proviso, that the judge may, if he thinks fit, continue the offender in gaol for any time not exceeding a year. And thus the law continued unaltered for above a century; except only, that the statute 21 Jac. I. c. 6. allowed, that women convicted of simple larcenies under the value of 10 s. should (not properly have the benefit of clergy, for they were not called upon to read; but) be burned in the hand, whipped, or stock-ed, or imprisoned for any time not exceeding a year. And a similar indulgence by the statutes 3 and 4 Will. and Mary c. 9. and 4 and 5 Will. and Mary c. 24. was extended to women guilty of any clergyable felony whatever; who were allowed once to claim the benefit of the statute, in like manner as men might claim the benefit of clergy, and to be discharged upon being burned in the hand, and imprisoned for any time not exceeding a year. All women, all peers, and all male commoners who could read, were therefore discharged in such felonies absolutely, if clerks in orders; and for the first offence upon burning in the hand, if lay; yet all liable (except peers), if the judge saw occasion, to imprisonment not exceeding a year. And these men who could not read, if under the degree of peerage, were hanged.

Afterwards, indeed, it was considered, that education and learning were no extenuations of guilt, but quite the reverse: and that if the punishment of death for simple felony was too severe for those who had been liberally instructed, it was, *à fortiori*, too severe for the ignorant also. And thereupon, by statute 5 Anne, c. 6. it was enacted, that the benefit of clergy should be granted to all those who were intitled to ask it, without requiring them to read by way of conditional merit. And, experience having shown that so universal a lenity was frequently inconvenient, and an encouragement to commit the lower degrees of felony; and that though capital punishments were too rigorous for these inferior offences, yet no punishment at all (or next to none, as branding or whipping), was as much too gentle; it was enacted by the same statute 5 Anne, c. 6. that when any person is convicted of any theft or larceny, and burnt in the hand for the same, he shall, at the discretion of the judge, be committed to the house of correction or public work-house, to be there kept to hard labour for any time not less than six months, and not exceeding two years; with a power of inflicting a double confinement in case of the party's escape from the first. And it is

also enacted by the statutes 4 Geo. I. c. 11. and 6. Geo. I. c. 23. that when any persons shall be convicted of any larceny, either grand or petit, or any felonious stealing or taking of money or goods and chattles, either from the person or the house of any other, or in any other manner, and who by the law shall be intitled to the benefit of clergy, and liable only to the penalties of burning in the hand, or whipping; the court, in their discretion, instead of such burning in the hand, or whipping, may direct such offenders to be transported to America for seven years; and if they return, or are seen at large in this kingdom within that time, it shall be felony without benefit of clergy.

In this state does the benefit of clergy at present stand; very considerably different from its original institution: the wisdom of the English legislature having, in the course of a long and laborious process, extracted, by a noble alchemy, rich medicines out of poisonous ingredients; and converted, by gradual mutations, what was at first an unreasonable exemption of particular popish ecclesiastics, into a merciful mitigation of the general law with respect to capital punishments.

From the whole of this detail, we may collect, that however in times of ignorance and superstition, that monster in true policy may for a while subsist, of a body of men residing in a state, and yet independent of its laws; yet when learning and rational religion have a little enlightened mens minds, society can no longer endure an absurdity so gross, as must destroy its very fundamentals. For, by the original contract of government, the price of protection by the united force of individuals, is that of obedience to the united will of the community. This united will is declared in the laws of the land: and that united force is exerted in their due, and universal, execution.

II. We are next to inquire, to what persons the benefit of clergy is to be allowed at this day: and this must chiefly be collected from what has been observed in the preceding article. For, upon the whole, we may pronounce, that all clerks in orders are, without any branding, and of course without any transportation (for that is only substituted in lieu of the other), to be admitted to this privilege, and immediately discharged, or at most only confined for one year; and this as often as they offend. Again, all lords of parliament, and peers of the realm, by the statute 1 Edw. VI. c. 12. shall be discharged in all clergyable and other felonies provided for by the act without any burning in the hand, in the same manner as real clerks convicted: but this is only for the first offence. Lastly, all the commons of the realm, not in orders, whether male or female, shall, for the first offence, be discharged of the punishment of felonies, within the benefit of clergy, upon being burnt in the hand, and suffering discretionary imprisonment; or, in case of larceny, upon being transported for seven years, if the court shall think proper.

III. The third point to be considered is, for what crimes the *privilegium clericale*, or benefit of clergy, is to be allowed. And it is to be observed, that neither in high treason, nor in petit larceny, nor in any mere misdemeanors, it was indulged at the common law: and therefore we may lay it down as a rule, that it was allowed only in petit treason and capital felonies;

Clergy. felonies; which for the most part became legally intitled to this indulgence by the statute *de clero*, 25 Edw. III. stat. 3. c. 4. which provides, that clerks convict for treason or felonies, touching other persons than the king himself or his royal majesty, shall have the privilege of holy church. But yet it was not allowed in all cases whatsoever: for in some it was denied even in common law, viz. *insidiatio viarum* or lying in wait for one on the highway; *depopulatio agrorum*, or destroying and ravaging a country; *combustio domorum*, or arson, that is, burning of houses; all which are a kind of hostile acts, and in some degree border upon treason. And farther, all these identical crimes, together with petit treason, and very many other acts of felony, are ousted of clergy by particular acts of parliament.

Upon the whole, we may observe the following rules. 1. That in all felonies, whether new created, or by common law, clergy is now allowable, unless taken away by act of parliament. 2. That where clergy is taken away from the principal, it is not of course taken away from the accessory, unless he be also particularly included in the words of the statute. 3. That when the benefit of clergy is taken away from the offence (as in case of murder, buggery, robbery, rape, and burglary), a principal in the second degree, being present, aiding and abetting the crime, is as well excluded from his clergy as he that is a principal in the first degree: but, 4. That where it is only taken away from the person committing the offence (as in the case of stabbing, or committing larceny in a dwelling-house), his aiders and abettors are not excluded, through the tenderness of the law, which hath determined that such statutes shall not be taken literally.

IV. Lastly, We are to inquire what the consequences are to the party, of allowing him this benefit of clergy. We speak not of the branding, imprisonment, or transportation; which are rather concomitant conditions, than consequences, of receiving this indulgence. The consequences are such as affect his present interest, and future credit and capacity: as having been once a felon, but now purged from that guilt by the privilege of clergy; which operates as a kind of statute pardon. And we may observe, 1. That, by his conviction, he forfeits all his goods to the king; which, being once vested in the crown, shall not afterwards be restored to the offender. 2. That, after conviction, and till he receives the judgment of the law by branding or the like, or else is pardoned by the king, he is, to all intents and purposes, a felon; and subject to all the disabilities and other incidents of a felon. 3. That, after burning or pardon, he is discharged for ever of that, and all other felonies before committed, within the benefit of clergy; but not of felonies from which such benefit is excluded: and this by statutes 8 Eliz. c. 4. and 18 Eliz. c. 7. 4. That, by the burning, or pardon of it, he is restored to all capacities and credits, and the possession of his lands, as if he had never been convicted. 5. That what is said with regard to the advantages of commoners and laymen, subsequent to the burning in the hand, is equally applicable to all peers and clergymen, although never branded at all. For they have the same privi-

leges, without any burning, to which others are intitled after it.

CLERK (*clericus*), a word formerly used to signify a learned man, or man of letters. The word comes from the Greek *κληρικός*, used for *clergy*; but more properly signifying *lot* or *heritage*, in regard the lot and portion of clerks or ecclesiastics is to serve God. Accordingly *clerus* was at first used to signify those who had a particular attachment to the service of God. The origin of the expression is derived from the Old Testament, where the tribe of Levi is called the *lot*, *heritage*, *κληρικός*; and God is reciprocally called *their portion*; by reason that tribe was consecrated to the service of God, and lived on the offerings made to God, without any other settled provision as the rest had. Thus, Pasquier observes, the officers of the counts (*comites*) were anciently created under the title of *clerks of accounts*; and secretaries of state were called *clerks of the secret*. So *clericus domini regis*, in the time of Edward I. was Englished, *the king's secretary*, or *clerk of his council*. The term was applied indifferently to all who made any profession of learning; or who knew how to manage the pen: though originally it was appropriated to ecclesiastics. As the nobility and gentry were usually brought up to the exercise of arms, there was none but the clergy left to cultivate the sciences: hence, as it was the clergy alone who made any profession of letters, a very learned man came to be called a *great clerk*, and a stupid ignorant man a *bad clerk*.

CLERK is also applied to such as by their course of life exercise their pens in any court or office; of which there are various kinds: thus,

CLERK of the Bails, an officer in the court of king's bench, whose business is to file all bail-pieces taken in that court, where he always attends.

CLERK of the Check, an officer belonging to the king's court; so called, because he has the check and controulment of the yeomen that belong to the king, queen, or prince. He likewise, by himself or deputy, sets the watch in the court. There is also an officer in the navy of the same name, belonging to the king's yards.

CLERK of the Crown, an officer in the king's bench, who frames, reads, and records all indictments against offenders there arraigned or indicted of any public crime. He is likewise termed *clerk of the crown-office*, in which capacity he exhibits information by order of the court for divers offences.

CLERK of the Crown, in chancery, an officer whose business it is constantly to attend the lord chancellor in person or by deputy; to write and prepare for the great seal special matters of state by commission, both ordinary and extraordinary, viz. commissions of lieutenancy, of justices of assize, oyer and terminer, gaol-delivery, and of the peace; all general pardons, granted either at the king's coronation or in parliament: the writs of parliament, with the names of the knights, citizens, and burgesses, are also returned into his office. He also makes out special pardons and writs of execution on bonds of statute-staple forfeited.

CLERK of the Deliveries of the Ordinance. See ORDINANCE.

CLERK of the Errors, in the court of common pleas, an officer who transcribes and certifies into the king's bench, the tenor of the record of the action on which the

Clerk. the writ of error, made out by the curfitor, is brought there to be determined. In the king's bench, the clerk of the errors transcribes and certifies the records of causes, by bill, in that court, into the exchequer. And the business of the clerk of the errors in the exchequer, is to transcribe the records certified thither out of the king's bench, and to prepare them for judgment in the exchequer-chamber.

CLERK of the Effoins, in the court of common pleas, keeps the effoin roll, or enters effoins: he also provides parchment, cuts it into rolls, marks the number on them, delivers out all the rolls to every officer, and receives them again when written. See ESSOIN.

CLERK of the Estreats, an officer in the exchequer, who every term receives the estreats out of the lord-treasurer's remembrancer's office, and writes them out to be levied for the crown.

CLERK of the Green-cloth, formerly an officer in chancery, but now abolished.

CLERK of the Hamper, or *Hanaper*, an officer in chancery, whose business is to receive all money due to the king for the seals of charters, letters patent, commissions, and writs; also the fees due to the officers for enrolling and examining them.

CLERK-Comptroller of the King's Household, an officer of the king's court, authorized to allow or disallow the charges of pursuivants, messengers of the green-cloth, &c. to inspect and controul all defects of any of the inferior officers; and to sit in the counting-house with the lord steward and others officers of the household for regulating such matters.

CLERK of the King's Silver, an officer of the common pleas, to whom every fine is brought, after it has passed the office of the *custos brevium*; and who enters the effect of writs of covenant, into a book kept for that purpose, according to which all the fines of that term are recorded in the rolls of the court.

CLERK of the Market, an officer of the king's house, to whom is given the charge of the king's measures and weights, the standards of those that ought to be used all over England.

CLERK of the Nichils or Nihils, an officer of the exchequer, who makes a roll of all such sums as are nichilled by the sheriffs upon their estreats of green wax, and delivers them in to the remembrancer of the treasury, to have execution done upon them for the king. See NIHIL.

CLERK of the Ordnance. See ORDNANCE.

CLERK of the Outlawries, an officer of the common pleas, and deputy to the attorney-general, for making out all writs of *capias utlegatum* after outlawry, to which there must be the king's attorney's name.

CLERK of the Paper-office, an officer belonging to the king's bench, whose business is to make up the paper-books of special pleadings in that court.

CLERK of the Peace, an officer belonging to the sessions of the peace, whose business is to read indictments, enrol the proceedings, and draw the process: he likewise certifies into the king's bench transcripts of indictments, outlawries, attainders, and convictions had before the justices of peace, within the time limited by statute, under a certain penalty. This office is in the gift of the *custos rotulorum*, and may be executed by deputy.

CLERK of the Pells, an officer that belongs to the exchequer, whose business is to enter every teller's bill into a parchment-roll called *pellis receptorum*; and to make another roll of payments called *pellis exituum*.

CLERK of the petty Bag, an officer of the court of chancery, whereof there are three, the master of the rolls being the chief: their business is to record the return of all inquisitions out of every shire; to make out patents of customers, gaugers, comptrollers, &c.; liberates upon extent of statutes-staple; *conge d'elires* for bishops; summons of the nobility, clergy, and burgesses to parliament; and commissions directed to knights and others of every shire, for assessing subsidies and taxes.

CLERK of the Pipe, an officer of the exchequer, who having the accounts of all debts due to the king, delivered out of the remembrancer's office, charges them in a great roll folded up like a pipe. He writes out warrants to sheriffs, to levy the said debts on the goods and chattels of the debtors; and if they have no goods, then he draws them down to the treasurer's remembrancer to write estreats against their lands.

CLERK of the Pleas, an officer of the exchequer, in whose office all the officers of the court, having special privilege, ought to sue or be sued in any action. In this office also actions at law may be prosecuted by other persons, but the plaintiff ought to be tenant or debtor to the king, or some way accountable to him. The under clerks are attorneys in all suits.

CLERKS of the Privy-seal, four officers that attend the lord privy seal, for writing and making out all things that are sent by warrant from the signet to the privy seal, and to be passed the great seal; and likewise to make out privy seals, upon special occasions of his majesty's affairs, as for loan of money, or the like.

CLERK of the Rolls, an officer of the chancery, whose business is to make searches after, and copies of deeds, officers, &c.

CLERK of the Signet, an officer continually attending upon his majesty's principal secretary, who has the custody of the privy signet, as well for sealing the king's private letters as those grants which pass the king's hand by bill signed. There are four of these officers who have their diet at the secretary's table.

Six CLERKS, officers in chancery next in degree below the twelve masters, whose business is to enrol commissions, pardons, patents, warrants, &c. which pass the great seal. They were anciently *clerici*, and forfeited their places if they married. These are also attorneys for parties in suits depending in the court of chancery.

CLERK of the Treasury, an officer belonging to the court of common pleas, who has the charge of keeping the records of the court, makes out all records of *nisi prius*, and likewise all exemplifications of records being in the treasury. He has the fees due for all searches; and has under him an under keeper, who always keeps one key of the treasury-door.

CLERK of the Warrants, an officer of the common pleas, whose business is to enter all warrants of attorney for plaintiffs and defendants in suit; and to enrol deeds of bargain and sale, that are acknowledged in court, or before a judge. His office is likewise to estreat into the exchequer all issues, fines, estreats, and amercements.

Clerk.

Clerke
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Clermont. amercements, which grow due to the crown in that court.

CLERKE (Captain Charles), a celebrated English navigator, was bred up in the navy from his youth, and was present in several actions during the war of 1755. In that between the *Bellona* and *Courageux* he was in great danger; for having been stationed in the mizen-top on board the former, the mast was carried overboard by a shot; and he fell into the sea along with it; but, however, was taken up without having received any injury. When Commodore Byron made his first voyage round the world, Mr Clerke served on board his ship in quality of a midshipman; and was afterwards on the American station. In the year 1768, he sailed round the world a second time in the *Endeavour*, on board of which he served in the station of master's mate; but, during the voyage, succeeded to a lieutenancy. He returned in 1775, and was soon after appointed master and commander. When Captain Cook undertook his last voyage, Mr Clerke was appointed Captain of the *Discovery*; and in consequence of the death of Captain Cook, naturally succeeded to the supreme command. He did not, however, long enjoy his new dignity. Before his departure from England, he had manifest symptoms of a consumption. Of this disease he lingered during the whole of the voyage; and his long residence in the cold northern climates cut off all hopes of recovery: but though sensible that the only chance he had of prolonging his life was by a speedy return to a warmer climate, his attention to his duty was so great, that he persevered in search of a passage between the Asiatic and American continents until every one of the officers was of opinion that it was impracticable. He bore his distemper with great firmness and equanimity, retaining a good flow of spirits to the last; and died on the 22d of August 1778, in the 38th year of his age, the ship being then within view of the coast of Kamtschatka.

CLERK'S *Island* lies on the western side of the American continent, in N. Lat. 63. 15. and W. Long. 170. 30. It was discovered by Captain Cook in his last voyage, but a landing could not be effected. At a distance it appeared to be of considerable extent, and to have several hills connected with the low grounds in such a manner as to make it look like a group of islands. Near its eastern extremity is a little island remarkable for having three elevated rocks upon it. Both the large and small island are uninhabited.

CLERMONT, a considerable, rich, and populous town of France, in Auvergne, with a bishop's see. The cathedral, the public squares, and the walks, are very fine. Here is a bridge naturally formed, as they pretend, by the petrifying quality of a fountain. E. Long. 3. 18. N. Lat. 45. 47.

CLERMONT *Manuscript*, is a copy of St Paul's Epistles, found in the monastery of Clermont in France, and used by Beza, [together with the Cambridge MS. in preparing his edition of the New Testament. This copy is in the octavo form, and is written on fine vellum in Greek and Latin, with some mutilations. Beza supposes that it is of equal antiquity with the Cambridge copy; but both were probably written by a Latin scribe in a later period than he assigns to them. The various readings of this MS. were communicated to archbishop Usher, and they are

preserved by Walton. The MS. itself was in the possession of Morinus; and after his death deposited among the MS. copies of the Royal Library at Paris, N^o 2245. Clermont-
cy
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Cleveland.

CLEROMANCY, a kind of divination performed by the throwing of dice, or little bones; and observing the points, or marks, turned up. The word comes from *κλῆρος*, lot," and *μαντεία*, "divination." At Bura, a city of Achaia, was a temple and celebrated oracle of Hercules; where such as consulted the oracle, after praying to the idol, threw four dies, the points whereof being well scanned by the priest, he was supposed to draw an answer from them.

Something of this kind seems to have been practised with regard to Jonah.

CLERVAL, a town of France, in the Franche Comté, seated on the river Doux, belonging to the house of Wirtemburgh, but depends on the crown of France. E. Long. 5. 57. N. Lat. 46. 35.

CLERVAUX, one of the most celebrated and finest abbeys of France, in Champagne, five miles from Bar-sur-Aube, and seated in a valley surrounded with woods and mountains. It is the chief of the Cistercian order. Here is the famous Tunn of St Bernard, which will hold 800 tuns of wine. Near this abbey is a small town.

CLESIDES, a Greek painter, about 276 years before Christ, in the reign of Antiochus I. He revenged the injuries he had received from queen Stratonice by representing her in the arms of a fisherman. However indecent the painter might represent the queen, she was drawn with such personal beauty, that she preserved the piece and liberally rewarded the artist.

CLETHRA, in botany: A genus of the monogynia order, belonging to the decandria class of plants; and in the natural method ranking under the 18th order, *Bicornes*. The calyx is quinquepartite: the petals five; the stigma trifid; the capsule trilocular and three-valved. There is but one species, viz. the *Alnifolia*. This is a native of Virginia and Carolina, where it grows in moist places, and near the sides of rivulets, rising near eight or ten feet high. The leaves are shaped like those of the alder-tree, but longer; these are placed alternately upon the branches: the flowers are produced in close spikes at the extremities of the branches; they are white, composed of five petals, and have ten stamina in each, nearly of the same length with the petals. This is hardy enough to bear the open air in Britain, and is one of the most beautiful flowering shrubs. Its season is commonly about the beginning of July; and, if the season is not very hot, there will be part of the spikes in beauty till the middle of September. This shrub will thrive best in moist land, and requires a sheltered situation, where it may be defended from strong winds, which frequently break off the branches where they are too much exposed to their violence. It is propagated by layers, but they are generally two years before they take root. It may also be propagated by suckers, which are sent out from the roots: if these are carefully taken off with fibres in the autumn, and planted in a nursery-bed, they will be strong enough in two years to transplant where they are to remain.

CLEVELAND, a district in the north riding of York-

Cleveland Yorkshire in England, from whence the noble family of Fitzroy took the title of Duke, but which is now extinct.

CLEVELAND (John), an English poet of some eminence in his time, who during the civil war under Charles I. engaged as a literary champion in the royal cause against the parliamentarians. He died in 1658, and was much extolled by his party. His works, which consisted of poems, characters, orations, epistles, &c. were printed in octavo in 1677.

CLEVES, the duchy of, a province of the circle of Westphalia, in Germany. It is divided into two parts by the Rhine, and is about 40 miles in length from east to west, and 20 in breadth from north to south. It is a fine agreeable country, and pretty populous. The towns are, Cleves the capital, Calcar, Gennet, Santen, Orsoy, Bureck, and Greit. These lie on the left side of the river. On the right, Duysburgh, Wese, Rees, and Emmerick. There have been great contests about this duchy, but it now belongs to the king of Prussia.

CLEVES, a city of Germany, in the duchy of Cleves, of which it is the capital. It stands upon a pleasant hill, about three miles from the Rhine, with which it communicates, by means of a canal which is large enough for great barges. The castle stands upon a mountain, and, though old, is very agreeable. Calvinists, Lutherans, and Roman Catholics, are all tolerated in the city. E. Long. 5. 36. N. Lat. 51. 40.

CLIENT, among the Romans, a citizen who put himself under the protection of some great man, who in respect of that relation was called *patron*.

This patron assisted his client with his protection, interest, and goods; and the client gave his vote for his patron, when he sought any office for himself or his friends. Clients owed respect to their patrons, as these owed them their protection.

The right of patronage was appointed by Romulus, to unite the rich and poor together, in a such a manner as that one might live without contempt, and the other without envy; but the condition of a client, in course of time, became little else but a moderate slavery.

CLIENT is now used for a party in a law-suit, who has turned over the cause into the hands of a counselor or solicitor.

CLIFFORTIA, in botany: A genus of the polyandria order, belonging to the diœcia class of plants; and in the natural method ranking under the 38th order, *Tricocœ*. The male calyx is triphyllous; no corolla; the stamina near 30 in number; the female calyx is triphyllous, superior to the receptacle of the fruit; no corolla; two styles; with a bilocular capsule; and a single seed. There are three species, all of them natives of Africa; so requires to be kept in a green-house when cultivated in this country. Their flowers make no great appearance; but the plants themselves are very ornamental evergreens. They grow to the height of four or five feet; and are propagated by cuttings, which must be young shoots of five or six inches length. If these are planted in pots in spring or summer, and plunged in a hot bed, they will readily take root. They must

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be watered plentifully in summer, but very sparingly in winter.

CLIMACTERIC, among physicians (from *climacter*, "a ladder"), a critical year in a person's life.

According to some, this is every seventh year; but others allow only those years produced by multiplying 7 by the odd number 3, 5, 7, and 9, to be climacterical. These years, they say, bring with them some remarkable change with respect to health, life, or fortune: the grand climacteric is the 63d year; but some, making two, add to this the 81st: the other remarkable climacterics are the 7th, 21st, 35th, 49th, and 56th.

CLIMATE, or CLIME, in geography, a part of the surface of the earth, bounded by two circles parallel to the equator; and of such a breadth, as that the longest day in the parallel nearer the pole exceeds the longest day in that next the equator by some certain spaces, viz. half an hour. The word comes from the Greek *κλίμα*, "inclinamentum," an inclination.

The beginning of the climate, is a parallel circle wherein the day is the shortest. The end of the climate is that wherein the day is the longest. The climates therefore are reckoned from the equator to the pole; and are so many bands, or zones, terminated by lines parallel to the equator: though, in strictness, there are several climates in the breadth of one zone. Each climate only differs from its contiguous ones, in that the longest day in summer is longer or shorter by half an hour in the one place than in the other. As the climates commence from the equator, the first climate at its beginning has its longest day precisely 12 hours long; at its end, 12 hours and an half: the second, which begins where the first ends, viz. at 12 hours and an half, ends at 13 hours; and so of the rest, as far as the polar circles, where, what the geographers call *hour-climates* terminate, and *month-climates* commence. As an hour-climate is a space comprised between two parallels of the equator, in the first of which the longest day exceeds that in the latter by half an hour; so the month climate is a space terminated between two circles parallel to the polar circles, whose longest day is longer or shorter than that of its contiguous one by a month or 30 days.

The ancients, who confined the climates to what they imagined the habitable parts of the earth, only allowed of seven. The first they made to pass through Meroe, the second through Sienna, the third through Alexandria, the fourth through Rhodes, the fifth through Rome, the sixth through Pontus, and the seventh through the mouth of the Borysthenes. The moderns, who have sailed further toward the poles, make 30 climates on each side; and, in regard the obliquity of the sphere makes a little difference in the length of the longest day, instead of half an hour, some of them only make the difference of climates a quarter.

Vulgarly the term *climate* is bestowed on any country or region differing from another either in respect of the seasons, the quality of the soil, or even the manners of the inhabitants; without any regard to the length of the longest day. Abulfeda, an Arabic author, distinguishes the first kind of climates by

I

the

Climacteric,
Climate.

Climate the term *real climates*, and the latter by that of *apparent climates*. Varenus gives us a table of 30 climates; but without any regard to the refraction.

Ricciolus furnishes a more accurate one, wherein the refractions are allowed for; an abstract of which follows:

Climate
||
Clitoria.

Middle of Clim.	Longest Day.	Latit.	Middle of Clim.	Longest Day.	Latit.	Middle of Clim.	Latit.	Cont. Light.	North Night.	Cont. Light.	South Night.
I	12th 30	7° 18	VIII	16th 0	48 15	XV	66° 53	31 ^d	27 ^d	30 ^d	28 ^d
II	13 0	15 36	IX	17 0	53 46	XVI	69 30	62	58	60	59
III	13 30	23 8	X	18 0	57 44	XVII	73 0	93	87	89	88
IV	14 0	29 49	XI	19 0	60 39	XVIII	78 6	124	117	120	118
V	14 30	35 35	XII	20 0	62 44	XIX	84 0	156	148	150	149
VI	15 0	40 32	XIII	22 0	65 10	XX	90 0	188	180	178	177
VII	15 30	44 42	XIV	24 0	65 54						

CLIMAX, or **GRADATION**, in rhetoric, a figure wherein the word or expression which ends the first member of a period begins the second, and so on; so that every member will make a distinct sentence, taking its rise from the next foregoing, till the argument and period be beautifully finished; as in the following gradation of Dr Tillotson: "After we have practised good actions a while, they become easy; and when they are easy, we begin to take pleasure in them; and when they please us, we do them frequently; and by frequency of acts a thing grows into a habit; and confirmed habit is a kind of second nature; and so far as any thing is natural, so far it is necessary; and we can hardly do otherwise; nay, we do it many times when we do not think of it."

CLINCH, in the sea language, that part of a cable which is bended about the ring of the anchor, and then seized or made fast.

CLINCHING, in the sea language, a kind of slight caulking used at sea, in a prospect of foul weather, about the posts: it consists in driving a little oakum into their seams, to prevent the water coming in at them.

CLINIC, a term applied by the ancient church-historians to those who received baptism on their death-bed.

CLINIC Medicine, was particularly used for the method of visiting and treating sick persons in bed, for the more exact discovery of all the symptoms of their disease.

CLINIAS, a Pythagorean philosopher, and musician, in the 65th Olympiad. He was wont to assuage his passion, being very choleric, by his lyre.

CLINOPODIUM, **FIELD BASIL**: A genus of the gymnospermia order, belonging to the didynamia class of plants; and in the natural method ranking under the 41st order, *Asperifolia*. The involucre consists of many small bristles under the verticillus or whirl of flowers. There are six species, all of them herbaceous plants, growing from one to two feet high. They are remarkable only for their strong odour, being somewhat between marjoram and basil.

CLIO, in pagan mythology, the first of the muses, daughter of Jupiter and Mnemosyne. She presided over history. She is represented crowned with laurels, holding in one hand a trumpet, and a book in the other. Sometimes she holds a plectrum or quill with

a lute. Her name signifies honour and reputation, *κλῆος*, *gloria*; and it was her office faithfully to record the actions of brave and illustrious heroes. She had Hyacintha by Pierius, son of Magnes.

CLIO, in zoology, a genus of insects belonging to the order of vermes mollusca. The body is oblong and fitted for swimming; and it has two membranaceous wings placed opposite to each other. The species are three, principally distinguished by the shape of their vagina, and are all natives of the ocean.

CLYPEUS, in natural history, a name given to the flat depressed centronia, from their resembling a shield. See **CENTRONIA**.

CLISTHENES, a famous Athenian magistrate, the author of the mode of banishing ambitious citizens by ostracism, or writing their names upon a shell: the intention was patriotic, but it was abused like all other human institutions; some of the worthiest citizens of Athens being thus exiled. He died 510 years before Christ.

CLITOMACHUS, the philosopher, flourished about 140 years before Christ. He was born at Carthage; quitted his country at 40 years of age; and went to Athens, where he became the disciple and successor of Carneades. He composed many books, but they are all lost.

CLITORIA, in botany: A genus of the decandria order, belonging to the diadelphia class of plants; and in the natural method ranking under the 32d order, *Papilionacea*. The corolla is supine, or turned down-side up; with the vexillum or flag-petal very large, patent, and almost covering the alae or wing-petals. There are four species, all of them herbaceous perennials, or annuals, of the kidney-bean kind, growing naturally in both the Indies. The stalk is climbing, slender, and of the height of a man. The leaves are winged, placed alternately, and consist of two, three, or five pair of lobes, terminated by an odd one. The flowers, which are elegant, stand singly, each on its proper foot-stalk. They are very large, and generally of a deep blue, but sometimes of a white colour. From the fruit of this plant is distilled an eye-water. The beans reduced to powder, and taken in broth, to the quantity of two drachms, prove a gentle purge; and Grimmius remarks, in his *Labor Ceyl.* that the powder of the dried beans, being mixed with the milk of the cocoa nut, or with broth, and administered in quantity

Plate
CXXXVIII.

Clitoris quantity from one to three drachms, not only mitigates colic pains, but is very useful and much used in Ceylon, in all disorders of the stomach and bowels. These plants are propagated by seeds; and, in this country, must be kept continually in a stove.

CLITORIS, in anatomy, is a part of the external pudenda, situated at the angle which the nymphæ form with each other. Like the penis it has an erection, and it is thought to be the principal seat of venereal pleasure. The clitoris is of different sizes in different women; but in general it is small, and covered with the labia. The preternaturally enlarged clitoris is what constitutes an hermaphrodite. When the clitoris is too large, it may be so extirpated as to remove the unnecessary part; but this requires much care, for a farther extirpation subjects the patient to an involuntary discharge of urine.

CLITUMNUS, (anc. geog.), a river of Umbria, on this side the Appennine. According to Pliny, it was a fountain consisting of several veins, situated between Hispellum and Spoletium; which soon after swelled into a very large and navigable river, running from east to west into the Tinea, and both together into the Tiber. A river famous for its milk-white flocks and herds, (Virgil). The god of the river was called *Clitumnus*.

CLITUS, brother to Alexander the Great's nurse, followed that prince in his conquests, and saved his life by cutting off the hand of Rosaces, which held an ax lifted up to kill him at the passage of the Granicus. Alexander, who had a great regard for him, some time after invited him to supper; when Clitus, at the end of the repast, being heated with wine, diminished the exploits of that prince, in order to magnify those of Philip his father. This so enraged Alexander, that he killed him with his own hand; but he was afterwards so afflicted at it, that he attempted his own life.

CLIVE (Robert) lord, son of Richard Clive, Esq; of Styche near Drayton in Salop, was born in 1725. Toward the close of the war in 1741, he was sent as a writer in the East India service to Madras; but being fonder of the camp than the counting-house, he soon availed himself of an opportunity to exchange his pen for a pair of colours. He first distinguished himself at the siege of Pondicherry in 1748; acted under major Laurence at the taking of Devi Cotta in Tanjore, who wrote of his military talents in high terms; commanded a small party for the taking of Arcot, and afterwards defended that place against the French; and performed many other exploits, which, considering the remoteness of the scene of action, would require a long detail to render sufficiently intelligible. He was, however, in brief, looked upon and acknowledged as the man who first roused his countrymen to spirited action, and raised their reputation in the East: so that when he came over to England in 1753, he was presented, by the court of directors, with a rich sword-set with diamonds, as an acknowledgment of past, and an incitement to future, services. Captain Clive returned to India in 1755, as governor of Fort St David, with the rank of lieutenant-colonel in the king's troops; when as commander of the company's troops, he, in conjunction with admiral Watson, reduced Angria the pirate, and became ma-

ster of Geria, his capital, with all his accumulated treasure. On the loss of Calcutta and the well known barbarity of the soubah Surajah Dowla, they sailed to Bengal; where they took fort William, in January 1757; and colonel Clive defeating the soubah's army soon after, accelerated a peace. Surajah Dowla's perfidy, however, soon produced fresh hostilities, which ended in his ruin; he being totally defeated by colonel Clive at the famous battle of Plassey. The next day the conqueror entered Muxadabad in triumph; and placed Jaffier Ally Cawn, one of the principal generals, on the throne: the deposed soubah was soon after taken, and privately put to death by Jaffier's son. Admiral Watson died at Calcutta; but colonel Clive commanded in Bengal the two succeeding years: he was honoured by the Mogul with the dignity of an Omrah of the empire; and was rewarded by the new soubah with a grant of lands, or a jaghire, producing 27,000 l. a-year. In 1760, he returned to England, where he received the unanimous thanks of the company, was elected member of parliament for Shrewsbury, and was raised to an Irish peerage by the title of Lord Clive Baron of Plassey. In 1764, fresh disturbances taking place in Bengal, Lord Clive was esteemed the only man qualified to settle them, and was accordingly again appointed to that presidency; after being honoured with the order of the Bath, and with the rank of major general. When he arrived in India, he exceeded the most sanguine expectation, in restoring tranquillity to the province without striking a blow, and fixed the highest ideas of the British power in the minds of the natives. He returned home in 1767; and, in 1772, when a parliamentary inquiry into the conduct of the East India company was agitated, he entered into an able justification of himself in a masterly speech in the house of commons. He died *suddenly* towards the close of the year 1774.

CLIVERS, or GOOSE-GRASS, in botany; a species of Galium. See **GALIAM**.

CLOACÆ, in antiquity, the common sewers of Rome, to carry off the dirt and soil of the city into the Tiber; justly reckoned among the grand works of the Romans. The first common sewer, called *Cloaca Maxima*, was built by Tarquinius, some say Priscus, others Superbus, of huge blocks of stone joined together without any cement, in the manner of the edifices of those early times; consisting of three rows of arches one above another, which at length conjoin and unite together; measuring in the clear 18 palms in height, and as many in width. Under these arches they rowed in boats; which made Pliny say that the city was suspended in air, and that they sailed beneath the houses. Under these arches also were ways through which carts loaded with hay could pass with ease. It began in the Forum Romanum; measured 300 paces in length; and emptied itself between the temple of Vesta and the Pons Senatorius. There were as many principal sewers as there were hills. Pliny concludes their firmness and strength from their standing for so many ages the shocks of earthquakes, the fall of houses, and the vast loads and weights moved over them.

CLOACINA, the goddess of jakes and common sewers, among the Romans.

CLOCK,

Clive
||
Cloacina.

Clock.

CLOCK, a machine constructed in such a manner, and regulated so by the uniform motion of a pendulum (A), as to measure time, and all its subdivisions, with great exactness.

The invention of clocks with wheels is referred to Pacificus, archdeacon of Verona, who lived in the time of Lotharius son of Louis the Debonnair, on the credit of an epitaph quoted by Ughelli, and borrowed by him from Panvinus. They were at first called *nocturnal dials*, to distinguish them from sun-dials, which showed the hour by the sun's shadow. Others ascribe the invention to Boethius, about the year 510. Mr Derham makes clock-work of a much older standing; and ranks Archimedes's sphere mentioned by Claudian, and that of Posidonius mentioned by Cicero, among the machines of this kind: not that either their form or use were the same with those of ours, but that they had their motion from some hidden weights or springs, with wheels, or pulleys, or some such clock-work principle. But be this as it will, it is certain the art of making clocks, such as are now in use, was either first invented, or at least retrieved, in Germany, about 200 years ago. The water clocks, or clypsydreæ, and sun-dials, have both a much better claim to antiquity. The French annals mention one of the former kind sent by Aaron, king of Persia, to Charlemagne, about the year 807, which seemed to bear some resemblance to the modern clocks: it was of brass, and showed the hours by twelve little balls of the same metal, which fell at the end of each hour, and in falling struck a bell and made it sound. There were also figures of 12 cavaliers, which at the end of each hour came forth at certain apertures or windows in the side of the clock, and shut them again, &c.

The invention of pendulum-clocks is owing to the happy industry of the last age: the honour of it is disputed by Huygens and Galileo. The former, who has written a volume on the subject, declares it was first put in practice in the year 1657, and the description thereof printed in 1658. Becher, *de Nova Temporis dimetiendi Theoria*, anno 1680, contends for Galileo; and relates, though at second-hand, the whole history of the invention; adding, that one Tresler, clock-maker to the then father of the Grand Duke of Tuscany, made the first pendulum-clock at Florence, by direction of Galileo Galilei; a pattern of which was brought into Holland. The Academy de' Ciementi say expressly, that the application of the pendulum to the movement of a clock was first proposed by Galileo, and first put in practice by his son Vincenzo Galilei, in 1649. Be the inventor who he will, it is certain the invention never flourished till it came into Huygens's hands, who insists on it, that if ever Galileo thought of such a thing, he never brought it to any degree of perfection. The first pendulum-clock made in England was in the year 1662, by Mr Fromantil a Dutchman.

Amongst the modern clocks, those of Strasburg and Lyons are very eminent for the richness of their furniture, and the variety of their motions and figures. In the first, a cock claps his wings, and proclaims the

hour; the angel opens a door, and salutes the virgin, and the Holy Spirit descends on her, &c. In the second, two horsemen encounter, and beat the hour on each other: a door opens, and there appears on the theatre the Virgin, with Jesus Christ in her arms; the Magi, with their retinue, marching in order and presenting their gifts; two trumpeters sounding all the while to proclaim the procession. These, however, are excelled by two lately made by English artists, and intended as a present from the East India company to the Emperor of China. The clocks we speak of are in the form of chariots, in which are placed, in a fine attitude, a lady, leaning her right hand upon a part of the chariot, under which is a clock of curious workmanship, little larger than a shilling, that strikes and repeats, and goes eight days. Upon her finger sits a bird finely modelled, and set with diamonds and rubies, with its wings expanded in a flying posture, and actually flutters for a considerable time on touching a diamond button below it; the body of the bird (which contains part of the wheels that in a manner give life to it) is not the bigness of the 16th part of an inch. The lady holds in her left hand a gold tube not much thicker than a large pin, on the top of which is a small round box, to which a circular ornament set with diamonds not larger than a sixpence is fixed, which goes round near three hours in a constant regular motion. Over the lady's head, supported by a small fluted pillar no bigger than a quill, is a double umbrella, under the largest of which a bell is fixed at a considerable distance from the clock, and seems to have no connection with it; but from which a communication is secretly conveyed to a hammer, that regularly strikes the hour, and repeats the same at pleasure, by touching a diamond button fixed to the clock below. At the feet of the lady is a gold dog; before which from the point of the chariot are two birds fixed on spiral springs; the wings and feathers of which are set with stones of various colours, and appear as if flying away with the chariot, which, from another secret motion, is contrived to run in a straight, circular, or any other direction; a boy that lays hold of the chariot behind, seems also to push it forward. Above the umbrella are flowers and ornaments of precious stones; and it terminates with a flying dragon set in the same manner. The whole is of gold, most curiously executed, and embellished with rubies and pearls.

Of the general Mechanism of Clocks, and how they measure Time. The first figure of Plate CXXXIX. is a profile of a clock: P is a weight that is suspended by a rope that winds about the cylinder or barrel C, which is fixed upon the axis *a a*; the pivots *b b* go into holes made in the plates TS, TS, in which they turn freely. These plates are made of brass or iron, and are connected by means of four pillars ZZ; and the whole together is called the frame.

The weight P, if not restrained, would necessarily turn the barrel C with an uniform accelerated motion, in the same manner as if the weight was falling freely from a height. But the barrel is furnished with a ratchet wheel K K, the right side of whose teeth strikes against the click, which is fixed with a screw to the wheel

(A) A balance, not unlike the fly of a kitchen-jack, was formerly used in place of the pendulum.

Clock. wheel DD, as represented in fig. 2. so that the action of the weight is communicated to the wheel DD, the teeth of which act upon the teeth of the small wheel *d* which turns upon the pivots *cc*. The communication or action of one wheel with another is called the *pitching*; a small wheel like *d* is called a *pinion*, and its teeth are leaves of the pinion. Several things are requisite to form a good pitching, the advantages of which are obvious in all machinery where teeth and pinions are employed. The teeth and pinion leaves should be of a proper shape, and perfectly equal among themselves: the size also of the pinion should be of a just proportion to the wheel acting into it; and its place must be at a certain distance from the wheel, beyond or within which it will make a bad pitching.

The wheel EE is fixed upon the axis of the pinion *d*; and the motion communicated to the wheel DD by the weight is transmitted to the pinion *d*, consequently to the wheel EE, as likewise to the pinion *e* and wheel FF, which moves the pinion *f*, upon the axis of which the crown or balance wheel GH is fixed. The pivots of the pinion *f* play in holes of the plates LM, which are fixed horizontally to the plates TS. In a word, the motion begun by the weight is transmitted from the wheel GH to the palettes IK, and by means of the fork UX rivetted on the palettes communicates motion to the pendulum AB, which is suspended upon the hook A. The pendulum AB describes, round the point A, an arc of a circle alternately going and returning. If then the pendulum be once put in motion by a push of the hand, the weight of the pendulum at B will make it return upon itself, and it will continue to go alternately backward and forward till the resistance of the air upon the pendulum, and the friction at the point of suspension at A, destroys the original impressed force. But as, at every vibration of the pendulum, the teeth of the balance-wheel GH act so upon the palettes IK (the pivots upon the axis of these palettes play in two holes of the potence *st*), that after one tooth H has communicated motion to the palette K, that tooth escapes; then the opposite tooth G acts upon the palette I, and escapes in the same manner; and thus each tooth of the wheel escapes the palettes IK, after having communicated their motion to the palettes in such a manner that the pendulum, instead of being stopt, continues to move.

The wheel EE revolves in an hour; the pivot *c* of this wheel passes through the plate, and is continued to *r*; upon the pivot is a wheel NN with a long socket fastened in the centre; upon the extremity of this socket *r* the minute-hand is fixed. The wheel NN acts upon the wheel O; the pinion of which *p* acts upon the wheel *gg*, fixed upon a socket which turns along with the wheel N. This wheel *gg* makes its revolution in 12 hours, upon the socket of which the hour-hand is fixed.

From the above description it is easy to see, 1. That the weight *p* turns all the wheels, and at the same time continues the motion of the pendulum. 2. That the quickness of the motion of the wheels is determined by that of the pendulum. 3. That the wheels point out the parts of time divided by the uniform motion of the pendulum.

When the cord upon which the weight is suspend-

ed is entirely run down from off the barrel, it is wound up again by means of a key, which goes on the square end of the arbor at Q, by turning it in a contrary direction from that in which the weight descends. For this purpose, the inclined side of the teeth of the wheel R (fig. 2.) removes the click C, so that the ratchet-wheel R turns while the wheel D is at rest; but as soon as the cord is wound up, the click falls in between the teeth of the wheel D, and the right side of the teeth again act upon the end of the click, which obliges the wheel D to turn along with the barrel; and the spring A keeps the click between the teeth of the ratchet-wheel R.

We shall now explain how time is measured by the motion of the pendulum; and how the wheel E, upon the axis of which the minute-hand is fixed, makes but one precise revolution in an hour. The vibrations of a pendulum are performed in a shorter or longer time in proportion to the length of the pendulum itself. A pendulum of 3 feet $8\frac{1}{2}$ French lines in length, makes 3600 vibrations in an hour: *i. e.* each vibration is performed in a second of time, and for that reason it is called a *second pendulum*. But a pendulum of 9 inches $2\frac{1}{4}$ French lines makes 7200 vibrations in an hour, or two vibrations in a second of time, and is called a *half second pendulum*. Hence, in constructing a wheel whose revolution must be performed in a given time, the time of the vibrations of the pendulum which regulates its motion must be considered. Supposing, then, that the pendulum AB makes 7200 vibrations in an hour, let us consider how the wheel E shall take up an hour in making one revolution. This entirely depends on the number of teeth in the wheels and pinions. If the balance wheel consists of 30 teeth, it will turn once in the time that the pendulum makes 60 vibrations: for at every turn of the wheel, the same tooth acts once on the palette I, and once on the palette K, which occasions two separate vibrations in the pendulum; and the wheel having 30 teeth, it occasions twice 30, or 60 vibrations. Consequently, this wheel must perform 120 revolutions in an hour; because 60 vibrations, which it occasions at every revolution, are contained 120 times in 7200, the number of vibrations performed by the pendulum in an hour. Now, in order to determine the number of teeth for the wheels EF and their pinions *ef*, it must be remarked, that one revolution of the wheel E must turn the pinion *e* as many times as the number of teeth in the pinion is contained in the number of teeth in the wheel. Thus, if the wheel E contains 72 teeth, and the pinion *e* 6, the pinion will make 12 revolutions in the time that the wheel makes 1; for each tooth of the wheel drives forward a tooth of the pinion, and when the 6 teeth of the pinion are moved, a complete revolution is performed; but the wheel E has by that time only advanced 6 teeth, and has still 66 to advance before its revolution be completed, which will occasion 11 more revolutions of the pinion. For the same reason, the wheel F having 60 teeth, and the pinion *f* 6, the pinion will make 10 revolutions while the wheel performs one. Now, the wheel F being turned by the pinion *e*, makes 12 revolutions for one of the wheel E; and the pinion *f* makes 10 revolutions for one of the wheel F; consequently, the pinion *f* performs 10 times 12 or

Clock.

120 revolutions in the time the wheel E performs one. But the wheel G, which is turned by the pinion *f*, occasions 60 vibrations in the pendulum each time it turns round; consequently the wheel G occasions 60 times 120 or 7200 vibrations of the pendulum while the wheel E performs one revolution; but 7200 is the number of vibrations made by the pendulum in an hour, and consequently the wheel E performs but one revolution in an hour; and so of the rest.

From this reasoning, it is easy to discover how a clock may be made to go for any length of time without being wound up: 1. By increasing the number of teeth in the wheels; 2. By diminishing the number of teeth in the pinions; 3. By increasing the length of the cord that suspends the weight; 4. By increasing the length of the pendulum; and, 5. By adding to the number of wheels and pinions. But, in proportion as the time is augmented, if the weight continues the same, the force which it communicates to the last wheel GH will be diminished.

It only remains to take notice of the number of teeth in the wheels which turn the hour and minute hands.

The wheel E performs one revolution in an hour; the wheel NN, which is turned by the axis of the wheel E, must likewise make only one revolution in the same time; and the minute-hand is fixed to the socket of this wheel. The wheel N has 30 teeth, and acts upon the wheel O, which has likewise 30 teeth, and the same diameter; consequently the wheel O takes one hour to a revolution: now the wheel O carries the pinion *p*, which has 6 teeth, and which acts upon the wheel *qq* of 72 teeth; consequently the pinion *p* makes 12 revolutions while the wheel *qq* makes one, and of course the wheel *qq* takes 12 hours to one revolution; and upon the socket of this wheel the hour-hand is fixed. All that has been said here concerning the revolutions of the wheels, &c. is equally applicable to watches as to clocks.

The ingenious Dr Franklin has contrived a clock to show the hours, minutes, and seconds, with only three wheels and two pinions in the whole movement. The dial plate (fig. 3) has the hours engraven upon it in spiral spaces along two diameters of a circle containing four times 60 minutes. The index A goes round in four hours, and counts the minutes from any hour by which it has passed to the next following hour. The time, therefore, in the position of the index shown in the figure is either 32½ minutes past XII. III. or VIII.; and so in every other quarter of the circle it points to the number of minutes after the hour which the index last left in its motion. The small hand B, in the arch at top, goes round once in a minute, and shows the seconds. The wheel-work of this clock may be seen in fig. 4. A is the first or great wheel, containing 160 teeth, and going round in four hours with the index A in fig. 3. let down by a hole on its axis. This wheel turns a pinion B of 10 leaves, which therefore goes round in a quarter of an hour. On the axis of this pinion is the wheel C of 120 teeth; which goes round in the same time, and turns a pinion D of eight leaves round in a minute, with the second hand B of fig. 3. fixed on its axis, and also the common wheel E of 30 teeth for moving a pendulum (by palettes) that vibrates seconds, as in a common

Clock.

clock. This clock is wound up by a line going over a pulley on the axis of the great wheel, like a common thirty hour clock. Many of these admirably simple machines have been constructed, which measure time exceedingly well. It is subject, however, to the inconvenience of requiring frequent winding by drawing up the weight, and likewise to some uncertainty as to the particular hour shown by the index A. Mr Ferguson has proposed to remedy these inconveniences by the following construction. In the dial-plate of his clock (fig. 5.) there is an opening *abcd* below the centre; through which appears part of a flat plate, on which the 12 hours, with their divisions into quarters, are engraven. This plate turns round in 12 hours; and the index A points out the true hour, &c. B is the minute hand, which goes round the large circle of 60 minutes whilst the plate *abcd* shifts its place one hour under the fixed index A. There is another opening *efg*, through which the seconds are seen on a flat moveable ring at the extremity of a fleur-de-lis engraven on the dial-plate. A in fig. 6. is the great wheel of this clock, containing 120 teeth, and turning round in 12 hours. The axis of this wheel bears the plate of hours, which may be moved by a pin passing through small holes drilled in the plate, without affecting the wheel-work. The great wheel A turns a pinion B of 10 leaves round in an hour, and carries the minute-hand B on its axis round the dial-plate in the same time. On this axis is a wheel C of 120 teeth, turning round a pinion D of six leaves in three minutes; on the axis of which there is a wheel E of 90 teeth, that keeps a pendulum in motion, vibrating seconds by palettes, as in a common clock, when the pendulum wheel has only 30 teeth, and goes round in a minute. In order to show the seconds by this clock, a thin plate must be divided into three times 60, or 180 equal parts, and numbered 10, 20, 30, 40, 50, 60, three times successively; and fixed on the same axis with the wheel of 90 teeth, so as to turn round near the back of the dial-plate; and these divisions will show the seconds through the opening *efgb*, fig. 5. This clock will go a week without winding, and always show the precise hour; but this clock, as Mr Ferguson candidly acknowledges, has two disadvantages of which Dr Franklin's clock is free. When the minute-hand B is adjusted, the hour-plate must also be set right by means of a pin; and the smallness of the teeth in the pendulum-wheel will cause the pendulum ball to describe but small arcs in its vibrations; and therefore the momentum of the ball will be less, and the times of the vibrations will be more affected by an unequal impulse of the pendulum-wheel on the palettes. Besides, the weight of the flat ring on which the seconds are engraven will load the pivots of the axis of the pendulum-wheel with a great deal of friction, which ought by all possible means to be avoided. To remedy this inconvenience, the second plate might be omitted.

A clock similar to Dr Franklin's was made in Lincolnshire about the end of last century or beginning of this; and is now in London in the possession of a grandson of the person who made it.

A clock, showing the apparent diurnal motions of the sun and moon, the age and phases of the moon, with the time of her coming to the meridian, and the times

Clock.

Plate
CXL.

times of high and low water, by having only two wheels and a pinion added to the common movement, was contrived by Mr Ferguson, and described in his *Select Exercises*. The dial-plate of this clock (fig. 7.) contains all the twenty-four hours of the day and night. S is the sun, which serves as an hour index, by going round the dial-plate in twenty-four hours; and M is the moon, which goes round in twenty-four hours fifty minutes and a half, the time of her going round in the heavens from one meridian to the same meridian again. The sun is fixed to a circular plate (see fig. 8.), and carried round by the motion of that plate on which the twenty-four hours are engraven; and within them is a circle divided into twenty-nine and a half equal parts for the days of the moon's age, reckoning from new moon to new moon; and each day stands directly under the time, in the twenty-four hour circle of the moon's coming to the meridian; the XII under the sun standing for noon, and the opposite XII for midnight. The moon M is fixed to another circular plate (fig. 6.) of the same diameter with that which carries the sun, part of which may be seen through the opening, over which the small wires *r* and *b* pass in the moon-plate. The wire *a* shows the moon's age and time of her coming to the meridian, and *b* shows the time of high-water for that day in the sun-plate. The distance of these wires answers to the difference of time between the moon's coming to the meridian and high-water at the place for which the clock is made. At London their difference is two hours and a half. Above the moon-plate there is a fixed plate N, supported by a wire A, fixed to it at one end and fixed at right angles into the dial-plate at the midnight XII. This plate may represent the earth, and the dot L London, or the place to which the clock is adapted. Around this plate there is an elliptic shade on the moon-plate, the highest points of which are marked high-water, and the lowest low-water. As this plate turns round below the plate N, these points come successively even with L, and stand over it at the times when it is high or low water at the given place; which times are pointed by the sun S on the dial-plate; and the plate H above XII at noon rises or falls with the tide. As the sun S goes round the dial-plate in twenty-four hours, and the moon M in twenty-four hours fifty minutes and a half, it is plain that the moon makes only twenty-eight revolutions and a half, whilst the sun makes twenty-nine and a half; so that it will be twenty-nine days and a half from conjunction to conjunction. And thus the wire *a* shifts over one day of the moon's age on the sun-plate in twenty-four hours. The phases of the moon for every day of her age may be seen through a round hole *m* in the moon-plate: thus, at conjunction or new-moon, the whole space seen through *m* is black; at opposition or full moon this place is white; at either quadrature half black and half white; and at every position the white part resembles the visible part of the moon for every day of her age. The black shaded space N F I (fig. 8.) on the sun-plate serves for these appearances. N represents the new moon, F the full moon, and *f* her first quarter, and *i* her last quarter, &c. The wheel-work and tide-work of this clock are represented in fig. 9. A and B are two wheels of equal diameters: A has fifty-seven teeth, with an hollow axis that passes through the dial of the clock, and carries

the sun-plate with the sun S. B has fifty-nine teeth, with a solid spindle for its axis, which turns within the hollow axis of A, and carries the moon-plate with the moon M: both wheels are turned round by a pinion C of nineteen leaves, and this pinion is turned round by the common clock-work in eight hours; and as nineteen is the third part of fifty-seven, the wheel A will go round in twenty-four hours; and the wheel B in twenty-four hours fifty minutes and a half: fifty-seven being to twenty-four as fifty-nine to twenty-four hours fifty minutes and a half very nearly. On the back of the wheel B is fixed an elliptical ring D, which, in its revolution, raises and lets down a lever EF, whose centre of motion is on a pin at F; and this, by the upright bar G, raises and lets down the tide-plate H twice in the time of the moon's revolving from the meridian to the meridian again: this plate moves between four rollers R, R, R, R. A clock of this kind was adapted by Mr Ferguson to the movement of an old watch: the great wheel of a watch goes round in four hours; on the axis of this he fixed a wheel of twenty teeth, to turn a wheel of forty teeth on the axis of the pinion C; by which means that pinion was turned round in eight hours, the wheel A in twenty-four, and the wheel B in twenty-four hours fifty minutes and a half.

To this article we shall subjoin a brief account of two curious contrivances. The first, for giving motion to the parts of a clock by making it to descend along an inclined plane, is the invention of Mr Maurice Wheeler; and the clock itself may be seen in Don Saltero's coffee-house at Chelsea. DE, fig. 10. is the inclined plane on which the clock ABC descends: this consists externally of a hoop about an inch broad, and two sides or plates standing out beyond the hoop about one-eighth of an inch all round, with indented edges, that the clock may not slide, but turn round whilst it moves down. One of these plates is inscribed with the twenty-four hours, which pass successively under the index LP, fig. 11. which is always in a position perpendicular to the horizon, and shows the hour on the top of the machine: for this reason the lower part of the index, or HL, is heaviest, that it may preponderate the other HP, and always keep it pendulous, with its point to the vertical hour, as the movement goes on. Instead of this index, an image may be fixed for ornament on the axis *g*, which with an erected finger performs the office of an index. In order to describe the internal part or mechanism of this clock, let L E T Q be the external circumference of the hoop, and *ff* the same plate, on which is placed the train of wheel-work 1, 2, 3, 4, which is much the same as in other clocks, and is governed by a balance and regulator as in them. But there is no need of a spring and fusee in this clock; their effects being otherwise answered, as we shall see. In this machine the great wheel of 1 is placed in the centre, or upon the axis of the movement, and the other wheels and parts towards one side, which would therefore prove a bias to the body of the clock; and cause it to move, even on the horizontal plane, for some short distance; this makes it necessary to fix a thin plate of lead at C, on the opposite part of the hoop, to restore the equilibrium of the movement. This being done, the machine will abide at rest in any position on the horizontal plane.

Clock.

Plate
CXLI.

HH.

Clock. HH; but if that plane be changed into the inclined plane DE, it will touch it in the point D; but it cannot rest there, because the centre of gravity at M acting in the direction MI, and the point T having nothing to support it, must continually descend, and carry the body down the plane. But now if any weight P be fixed on the other side of the machine, such as shall remove the centre of gravity from M to the point V in the line LD which passes through the point D, it will then rest upon the inclined plane, as in the case of the rolling cylinder. If this weight P be supposed not fixed, but suspended at the end of an arm, or vectis, which arm or lever is at the same time fastened to a central wheel ι , moving on the axis M of the machine, which wheel by its teeth shall communicate with the train of wheels, &c. on the other side, and the power of the weight be just equal to the friction or resistance of the train, it will remain motionless as it did before when it was fixed; and consequently the clock also will be at rest on the inclined plane. But supposing the power of the weight P to be superior to the resistance of the train, it will then put it into motion, and of course the clock likewise; which will then commence a motion down the plane; while the weight P, its vectis PM, and the wheel ι , all constantly retain the same position which they have at first when the clock begins to move. Hence it is easy to understand, that the weight P may have such an intrinsic gravity, as shall cause it to act upon the train with any required force, so as to produce a motion in the machine of any required velocity; such, for instance, as shall carry it once round in twenty-four hours: then, if the diameters of the plates ABC be four inches, it will describe the length of their circumference, viz. 12,56 inches in one natural day; and therefore, if the plane be of a sufficient breadth, such a clock may go several days, and would furnish a perpetual motion, if the plane were infinitely extended. Let SD be drawn through M perpendicular to the inclined plane in the point D; also let LD be perpendicular to the horizontal line HH, passing thro' D; then is the angle HDE = LDS = DMT; whence it follows that the greater the angle of the plane's elevation is, the greater will be the arch DT; and consequently the further will the common centre of gravity be removed from M; therefore the power of P will be augmented, and of course the motion of the whole machine accelerated. Thus it appears, that by duly adjusting the intrinsic weight of P, at first to produce a motion showing the mean time as near as possible, the time may be afterwards corrected, or the clock made to go faster or slower by raising or depressing the plane, by means of the screw at S. The angle to which the plane is first raised is about ten degrees. The marquis of Worcester is also said to have contrived a watch that moved on a declivity. See farther Phil. Trans. Abr. vol. 1. p. 468, &c. or n^o 161.

The other contrivance is that of M. de Gennes for making a clock ascend on an inclined plane. To this end let ABC (fig. 12.) be the machine on the inclined plane EDE, and let it be kept at rest upon it, or in equilibrio by the weight P at the end of the lever PM. The circular area CF is one end of the spring barrel in the middle of the movement, in which is included a spring as in a common watch. To this end of the barrel the arm or lever PM is fixed upon the centre M;

and thus, when the clock is wound up, the spring moves the barrel, and therefore the lever and weight P in the situation PM. In doing this, the centre of gravity is constantly removed farther from the centre of the machine, and therefore it must determine the clock to move upwards, which it will continue to do as long as the spring is unbending itself; and thus the weight and its lever PM will preserve the situation they first have, and do the office of a chain and fusee. Phil. Trans. n^o 140. or Abridg. vol. i. p. 467.

By stat. 9 and 10 W. III. cap. 28. § 2. no person shall export, or endeavour to export out of this kingdom, any outward or inward box-case or dial-plate, of gold, silver, brass, or other metal, for clock or watch, without the movement in or with every such box, &c. made up fit for use, with the maker's name engraven thereon; nor shall any person make up any clock or watch without putting his name and place of abode or freedom, and no other name or place, on every clock or watch; on penalty of forfeiting every such box, case, and dial-plate, clock and watch, not made up and engraven as aforesaid; and 20 l. one moiety to the king, the other to those that shall sue for the same.

CLOCKS, portable, or pocket, commonly denominated *Watches*. See the article WATCH.

Clock-Work, properly so called, is that part of the movement which strikes the hours, &c. on a bell; in contradistinction to that part of the movement of a clock or watch which is designed to measure and exhibit the time on a dial-plate, and which is termed *Watch-work*.

I. Of the *Clock-part*. The wheels composing this part are: The great or first wheel H; which is moved by the weight or spring at the barrel G: in sixteen or thirty-hour clocks, this has usually pins, and is called the *pin-wheel*; in eight-day pieces, the second wheel I is commonly the pin-wheel, or striking-wheel, which is moved by the former. Next the striking-wheel is the detent-wheel, or hoop-wheel K, having a hoop almost round it, wherein is a vacancy at which the clock locks. The next is the third or fourth wheel, according to its distance from the first, called the *warning-wheel* L. The last is the flying pinion Q, with a fly or fan, to gather air, and so bridle the rapidity of the clock's motion. To these must be added the pinion of report; which drives round the locking-wheel, called also the *count-wheel*; ordinarily with eleven notches in it, unequally distant, to make the clock strike the hours.

Besides the wheels, to the clock part belongs the ratch or ratchet; a kind of wheel with twelve large fangs, running concentric to the dial-wheel, and serving to lift up the detents every hour, and make the clock strike: the detents or stops, which being lifted up and let fall, lock and unlock the clock in striking; the hammer, as S, which strikes the bell R; the hammer-tails, as T, by which the striking pins draw back the hammers; latches, whereby the work is lifted up and unlocked; and lifting-pieces, as P, which lift up and unlock the detents.

The method of calculating the numbers of a piece of clock-work having something in it very entertaining, and at the same time very easy and useful, we shall give the readers the rules relating thereto: 1. Regard here needs only be had to the counting-wheel,

Clock. striking-wheel, and detent-wheel, which move round in this proportion: the count-wheel commonly goes round once in 12 or 24 hours; the detent-wheel moves round every stroke the clock strikes, or sometimes but once in two strokes: wherefore it follows, that, 2. As many pins as are in the pin-wheel, so many turns hath the detent-wheel in one turn of the pin-wheel; or, which is the same, the pins of the pin-wheel are the quotients of that wheel divided by the pinion of the detent-wheel. But if the detent-wheel move but once round in two strokes of the clock, then the said quotient is but half the number of pins. 3. As many turns of the pin-wheel as are required to perform the strokes of 12 hours (which are 78), so many turns must the pinion of report have to turn round the count-wheel once: or thus, the quotient of 78, divided by the number of striking-pins, shall be the quotient for the pinion of report and the count-wheel; and this is in case the pinion of report be fixed to the arbor of the pin-wheel, which is commonly done.

An example will make all plain: The locking wheel being 48, the pinion of report 8, the pin-wheel 78, the striking pins are 13, and so of the rest. Note also, that 78 divided by 13 gives 6, the quotient of the pinion of report. As for the warning-wheel and fly-wheel, it matters little what numbers they have; their use being only to bridle the rapidity of the motion of the other wheels.

The following rules will be of good service in this calculation. 1. *To find how many strokes a clock strikes in one hour of the fusee or barrel:* As the turns of the great wheel or fusee are to the days of the clock's continuance; so is the number of strokes in 24 hours, viz. 156, to the strokes of one turn of the fusee.

2. *To find how many days a clock will go:* As the strokes in 24 hours are to those in one turn of the fusee; so are the turns of the fusee to the days of the clock's going.

3. *To find the number of turns of the fusee or barrel:* As the strokes in one turn of the fusee are to those of 24 hours; so is the clock's continuance to the turns of the fusee or great wheel.

4. *To find the number of leaves in the pinion of report on the axis of the great wheel:* As the number of strokes in the clock's continuance is to the turns of the fusee; so are the strokes in 12 hours, viz. 78, to the quotient of the pinion of report fixed on the arbor of the great wheel.

5. *To find the strokes in the clock's continuance:* As 12 is to 78; so are the hours of the clock's continuance to the number of strokes in that time.

By means of the following table, clocks and watches may be so regulated as to measure true equal time.

Days.	H. M.	S.	The stars make 366 revolutions from any point of the compass to the same point again in 365 days and one minute; and therefore they gain a 365th of a revolution every 24 hours of mean solar time, near enough for regulating any clock or watch.
10	3	56	
20	7	52	
30	11	48	
40	15	44	
50	19	39	
60	23	35	
70	27	31	

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3 minutes, 56 seconds; by which quantity of time every star comes round sooner than it did on the day before.

Therefore if you mark the precise moment shown by a clock or watch when any star vanishes behind a chimney, or any other object, as seen thro' a small hole in a thin plate of metal, fixed in a window-shutter; and do this for several nights successively (as suppose 20); if, at the end of that time, the star vanishes as much sooner than it did the first night, by the clock, as answers to the time denoted in the table for so many days, the clock goes true; otherwise not. If the difference between the clock and star be less than the table shows, the clock goes too fast; if greater, it goes too slow; and must be regulated accordingly, by letting down or raising up the ball of the pendulum, by little and little, by turning the screw-nut under the ball, till you find it keeps true equal time.

Thus, supposing the star should disappear behind a chimney, any night when it is XII. by the clock; and that, on the 20th night afterward, the same star should disappear when the time is 41 minutes 22 seconds past X. by the clock; which being subtracted from 12 hours 0 min. 0 sec. leaves remaining 1 hour 18 minutes 38 seconds for the time the star is then faster than the clock: look in the table, and against 20, in the left hand column, you will find the acceleration of the star to be 1 hour 18 min. 38 sec. agreeing exactly with what the difference ought to be between the clock and star: which shows that the clock measures true equal time, and agrees with the mean solar time as it ought to do.

II. Of the *Watch*-part of a clock or watch. This is that part of the movement which is designed to measure and exhibit the time on a dial-plate; in contradistinction to that part which contributes to the striking of the hour, &c.

The several members of the watch-part are, 1. The balance, consisting of the rim, which is its circular part; and the verge, which is its spindle; to which belong two palettes or leaves, that play in the teeth of the crown-wheel. 2. The potence, or pottance, which is the strong stud in pocket-watches, whereon the lower pivot of the verge plays, and in the middle of which one pivot of the balance-wheel plays; the bottom of the pottance is called the foot, the middle part the nose, and the upper part the shoulder. 3. The cock, which is the piece covering the balance. 4. The regulator, or pendulum spring, which is the small spring, in the new pocket-watches underneath the balance. 5. The pendulum (fig. 13); whose parts are, the verge α , palettes β, γ , cocks δ, ϵ , the rod, the fork ζ , the flatt η , the bob or great ball θ , and the corrector or regulator 4, being a contrivance of Dr Derham for bringing the pendulum to its nice vibrations. 6. The wheels, which are the crown-wheel F in pocket-pieces, and swing-wheel in pendulums; serving to drive the balance or pendulum. 7. The contrate wheel E, which is that next the crown-wheel, &c. and whose

K

teeth

8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	35	39	43	47	51	55	58	2	6	10	14	18	22	26	30	34	38	42	46	50	54	57
27	23	19	15	11	7	3	58	54	50	46	42	38	34	30	26	22	17	13	9	5	1	57

Clock.

Clock. teeth and hoop lie contrary to those of other wheels; whence the name. 8. The great, or first wheel C; which is that the fusee B, &c. immediately drives, by means of the chain or string of the spring-box or barrel A; after which are the second wheel D, third wheel, &c. Lastly, between the frame and dial-plate, is the pinion of report, which is that fixed on the arbor of the great wheel; and serves to drive the dial-wheel, as that serves to carry the hand.

For the illustration of this part of the work which lies concealed, let ABC (fig. 14.) represent the uppermost side of the frame plate, as it appears when detached from the dial-plate: the middle of this plate is perforated with a hole, receiving that end of the arbor of the centre wheel which carries the minute hand; near the plate is fixed the pinion of report *ab* of 10 teeth; this drives a wheel *cd* of 40 teeth; this wheel carries a pinion *ef* of 12 teeth; and this again drives a wheel *gh* with 36 teeth.

As in the body of the watch the wheels every where divide the pinions; here, on the contrary, the pinions divide the wheels, and by that means diminish the motion, which is here necessary; for the hour-hand, which is carried on a socket fixed on the wheel *gh*, is required to move but once round, while the pinion *ab* moves 12 times round. For this purpose the motion of the wheel *cd* is $\frac{1}{4}$ of the pinion *ab*. Again, while the wheel *cd*, or the pinion *ef*, goes once round, it turns the wheel *gh* but $\frac{1}{3}$ part round; consequently the motion of *gh* is but $\frac{1}{3}$ of $\frac{1}{4}$ of the motion of *ab*; but $\frac{1}{3}$ of $\frac{1}{4}$ is $\frac{1}{12}$; i. e. the hour-wheel *gh* moves once round in the time that the pinion of report, on the arbor of the centre or minute wheel, makes 12 revolutions, as required. Hence the structure of that part of a clock or watch which shows the time may be easily understood.

The cylinder A (fig. 13.) put into motion by a weight or inclosed spring moves the fusee B, and the great wheel C, to which it is fixed by the line or cord that goes round each, and answers to the chain of a watch.

The method of calculation is easily understood by the sequel of this article: for, suppose the great wheel C goes round once in 12 hours, then if it be a royal pendulum clock, swinging seconds, we have $60 \times 60 \times 12 = 43200$ seconds or beats in one turn of the great wheel. But because there are 60 swings or seconds in one minute, and the seconds are shown by an index on the end of the arbor of the swing-wheel, which in those clocks is in an horizontal position; therefore, it is necessary that the swing-wheel F should have 30 teeth; whence $43200 \div 30 = 1440$, the number to be broken into quotients for finding the number of teeth for the other wheels and pinions.

In spring-clocks, the disposition of the wheels in the watch-part is such as is here represented in the figure, where the crown-wheel F is in an horizontal position; the seconds not being shown there by an index, as is done in the large pendulum clocks. Whence in these clocks the wheels are disposed in a different manner, as represented in fig. 14. where C is the great wheel, and D the centre or minute wheel, as before: but the contrate-wheel E is placed on one side, and F the swing-wheel is placed with its centre in the same per-

pendicular line GH with the minute-wheel, and with its plane perpendicular to the horizon, as are all the others. Thus the minute and hour hands turn on the end of the arbor of the minute-wheel at *a*, and the second hand on the arbor of the swing-wheel at *b*.

Theory and calculation of the Watch-part, as laid down by the Rev. Dr Derham.—1. The same motion, it is evident, may be performed either by one wheel and one pinion, or many wheels and many pinions; provided the number of turns of all the wheels bear the proportion to all the pinions which that one wheel bears to its pinion: or, which is the same thing, if the number produced by multiplying all the wheels together, be to the number produced by multiplying all the pinions together, as that one wheel to that one pinion. Thus, suppose you had occasion for a wheel of 1440 teeth, with a pinion of 28 leaves; you make it into three wheels of 36, 8, and 5, and three pinions of 4, 7, and 1. For the three wheels, 36, 8, and 5, multiplied together, give 1440 for the wheels, and the three pinions 4, 7, and 1, multiplied together, give 28 for the pinions. Add, that it matters not in what order the wheels and pinions are set, or which pinion runs in which wheel; only, for convenience sake, the biggest numbers are commonly put to drive the rest.

2. Two wheels and pinions of different numbers may perform the same motion. Thus, a wheel of 36 drives a pinion of 4; the same as a wheel of 45 a pinion of 5; or a wheel of 90 a pinion of 10: the turns of each being 9.

3. If, in breaking the train into parcels, any of the quotients should not be liked; or if any other two numbers, to be multiplied together, are desired to be varied; it may be done by this rule. Divide the two numbers by any other two numbers which will measure them; multiply the quotients by the alternate divisors; the product of these two last numbers found will be equal to the product of the two numbers first given. Thus, if you would vary 36 times 8, divide these by any two numbers which will evenly measure them: so, 36 by 4 gives 9; and 8 by 1 gives 8: now, by the rule, 9 times 1 is 9, and 8 times 4 is 32; so that for 36×8 , you have 32×9 ; each equal to 288. If you divide 36 by 6 and 8 by two, and multiply as before, you have $24 \times 12 = 36 \times 8 = 288$.

4. If a wheel and pinion fall out with cross numbers, too big to be cut in wheels, and yet not to be altered by these rules; in seeking for the pinion of report, find two numbers of the same, or a near proportion, by this rule: as either of the two given numbers is to the other, so is 360 to a fourth. Divide that fourth number, as also 360, by 4, 5, 6, 8, 9, 10, 12, 15 (each of which numbers exactly measures 360), or by any of those numbers that bring a quotient nearest to an integer. As suppose you had 147 for the wheel, and 170 for the pinion; which are too great to be cut into small wheels, and yet cannot be reduced into less, as having no other common measure but unity; say, as $170 : 147 :: 360 : 311$. Or, as $147 : 170 :: 360 : 416$. Divide the fourth number and 360 by one of the foregoing numbers; as 311 and 360 by 6, it gives 52 and 60; divide them by 8, you have 39 and 45; and if you divide 360 and 416 by 8,

Clock. 8, you have 45 and 52 exactly. Wherefore, instead of the two numbers 147 and 170, you may take 52 and 60, or 39 and 45, or 45 and 52, &c.

5. To come to practice in calculating a piece of watch-work: First pitch on the train or beats of the balance in an hour; as, whether a swift one of about 20,000 beats (the usual train of a common 30 hour pocket-watch), or a slower of about 16,000 (the train of the new pendulum pocket-watches), or any other train. Next, resolve on the number of turns the fusee is intended to have, and the number of hours the piece is to go: suppose, *e. g.* 12 turns, and to go 30 hours, or 192 hours (*i. e.* 8 days), &c. Proceed now to find the beats of the balance or pendulum in one turn of the fusee; thus in numbers; $12 : 16 :: 20000 : 26666$. Wherefore, 26666 are the beats in one turn of the fusee or great wheel, and are equal to the quotients of all the wheels unto the balance multiplied together. Now this number is to be broken into a convenient parcel of quotients; which is to be done thus: first, halve the number of beats, viz. 26666, and you have 13333; then pitch on the number of the crown-wheel, suppose 17: divide 13333 by 17, and you have 784 for the quotient (or turns) of the rest of the wheels and pinions; which, being too big for one or two quotients, may be best broken into three. Choose therefore three numbers; which, when multiplied all together continually, will come nearest 784: as suppose 10, 9, and 9, multiplied continually, give 810, which is somewhat too much; therefore try again other numbers, 11, 9, 8: these, drawn one into another continually, produce 792; which is as near as can be, and is a convenient quotient. Having thus contrived the piece from the great wheel to the balance, but the numbers not falling out exactly, as you first proposed, correct the work thus: first, multiply 792, the product of all the quotients pitched upon, by 17 (the notches of the crown-wheel); the product is 13464, which is half the number of beats in one turn of the fusee: Then find the true number of beats in an hour. Thus, $16 : 12 :: 13464 : 10098$, which is half the beats in an hour. Then find what quotient is to be laid upon the pinion of report (by the rule given under that word). Thus, $16 : 12 :: 12 : 9$, the quotient of the pinion of report. Having thus found your quotients, it is easy to determine what numbers the wheels shall have, for choosing what numbers the pinions shall have, and multiplying the pinions by their quotients, the product is the number for the wheels. Thus, the number of the pinion of report is 4, and its quotient is 9; therefore the number for the dial-wheel must be 4×9 , or 36: so the next pinion being 5, its quotient 11, therefore the great wheel must be $5 \times 11 = 55$; and 17 so of the rest.

Such is the method of calculating the numbers of a 16 hour watch. Which watch may be made to go longer by lessening the train, and altering the pinion of report. Suppose you could conveniently slacken the train to 16000; then say, As $\frac{1}{2}$ 16000, or 8000: 13464 :: 12 : 20; so that this watch will go 20 hours. Then for the pinion of report, say (by the rule given under that word), as $20 : 12 :: 12 : 7$. So that 7

is the quotient of the pinion of report. 4) 28 (7 **Clock.**
And as to the numbers, the operation is the same as before, only the dial-wheel 5) 55 (11 is but 28; for its quotient is altered to 7. 5) 45 (9
If you would give numbers to a watch of 5) 40 (8 about 10000 beats in an hour, to have 12 turns of the fusee, to go 170 hours, and 17 notches in the crown-wheel; the work is the same, in a manner, as in the last example: and consequently thus: as $12 : 170 :: 10000 : 141666$, which fourth number is the beats in one turn of the fusee; its half, 70833, being divided by 17, gives 4167 for the quotient: and because this number is too big for three quotients, therefore choose four, as 10, 8, 8, $6\frac{1}{2}$; whose product into 17 makes 71808, nearly equal to half the true beats in one turn of the fusee. Then say, as $170 : 12 : 71808 : 5069$, which is half the true train of your watch. And again, $170 : 12 :: 12 : \frac{144}{78}$, the denominator of which expresses the opinion of report, and the numerator is the number of the dial-wheel. But these numbers being too big to be cut in small wheels, they must be varied by the fourth rule above. Thus:

As $144 : 170 :: 360 : 425$;

Or $170 : 144 :: 360 : 305$.

Then dividing 360, and either of these 24) 20 ($\frac{10}{3}$ two fourth proportionals (as directed by the rule), suppose by 15; you will have 6) 60 (10 $\frac{24}{8}$ or $\frac{10}{3}$; then the numbers of the whole 6) 48 (8 movement will stand as in the margin. 5) 40 (8

Such is the calculation of ordinary 5) 33 ($6\frac{1}{2}$ watches, to show the hour of the day: in such as show minutes, and seconds, 17 the process is thus:

1. Having resolved on the beats in an hour; by dividing the designed train by 60, find the beats in a minute; and accordingly, find proper numbers for the crown-wheel and quotients, so as that the minute-wheel shall go round once in an hour, and the second wheel once in a minute.

Suppose, *e. g.* you shall choose a pendulum of seven inches, which vibrates 142 strokes in a minute, and 8520 in an hour. Half these sums are 71, and 4260. Now, the first work is to break this 71 into a good proportion, which will fall into one quotient, and the crown-wheel. Let the crown-wheel have 15 notches; then 71, divided by 15, gives nearly 5; to a crown-wheel of 15, and a wheel and pinion whose quotient is 5, will go round in a minute to carry a hand to show seconds. For a hand to go round in an hour to show minutes, because 8) 40 (5 there are 60 minutes in an hour, it is but breaking 60 into good quotients (suppose 10 and 6, or 8 and $7\frac{1}{2}$, &c.), and it is done. Thus 4260 is broken as near as 8) 64 (8 can be into proper numbers. But since it 8) 60 ($7\frac{1}{2}$ does not fall out exactly into the above- 8) 40 (5 mentioned numbers, you must correct (as before directed), and find the true number of beats in an hour, by multiplying 15 by 5, which makes 75; and 75 by 60 makes 4500, which is half the true train. Then find the beats in one turn of the fusee; thus, $16 : 192 :: 4500 : 54000$; which last is half the beats in one turn of the fusee. This

Clock.
Clodia lex.

9) 108 (12 numbers already pitched on), the quo-
8) 64 (8 tient will be 12; which, not being too big
8) 60 ($7\frac{1}{2}$ for a single quotient, needs not be divided
8) 40 (5 into more; and the work will stand as in
the margin. As to the hour-hand, the
15 great wheel, which performs only one re-
volution in 12 turns of the minute-wheel,
will show the hour; or it may be done by the minute-
wheel.

It is requisite for those who make nice astronomical observations, to have watches that make some exact number of beats *per second*, without any fraction; but we seldom find a watch that does. As four beats *per second* would be a very convenient number, we shall here give the train for such a watch, which would (like most others) go 30 hours, but is to be wound up once in 24 hours.

The fusee and first wheel to go round in four hours. This wheel has 48 teeth, and it turns a pinion of 12 leaves, on whose axis is the second wheel, which goes round in one hour, and carries the minute hand. This wheel has 60 teeth, and turns a pinion of 10 leaves; on whose axis is the third wheel of 60 teeth, turning a pinion of 6 leaves; on whose axis is the fourth (or contrate) wheel, turning round in a minute, and carrying the small hand that shows the seconds, on a small circle on the dial-plate, divided into 60 parts; this contrate wheel has 48 teeth, and turns a pinion of 6 leaves; on whose axis is the crown or balance-wheel of 15 teeth, which makes 30 beats in each revolution.

The crown-wheel goes 480 times round in an hour, and 30 times 480 make 14400; the number of beats in an hour. But one hour contains 3600 seconds; and 14400 divided by 3600 quotes 4, the required number of beats in a second.

The fusee must have $7\frac{1}{2}$ turns, to let the chain go so many times round it. Then, as 1 turn is to 4 hours, so is $7\frac{1}{2}$ turns to 30 hours, the time the watch would go after it is wound up.

See further the articles MOVEMENT, TURN, &c. And for the history and particular construction of Watches properly so called, see the article WATCH.

CLODIA LEX, *de Cypra*, was enacted by the tribune Clodius, in the year of Rome 607, to reduce Cyprus into a Roman province, and expose Ptolemy king of Egypt to sale in his regal ornaments. It impowered Cato to go with the prætorian power and see the auction of the king's goods, and commissioned him to return the money to Rome. Another, *de Magistratibus*, 695, by Clodius the tribune. It forbade the censors to put a stigma or mark of infamy upon any person who had not been actually accused and condemned by both the censors. Another, *de Religione*, by the same, 696, to deprive the priest of Cybele, a native of Pessinus, of his office, and confer the priesthood upon Brotigonus, a Gallogrecian. Another, *de Provinciis*, 695, which nominated the provinces of Syria, Babylon, and Persia, to the consul Gabinus, and Achaia, Thessaly, Macedon, and Greece, to his colleague Piso, with proconsular power. It impowered them to defray the expences of their march from the public treasury. Another, 695, which required the same distribution of corn among the

people gratis, as had been given them before at five asses and a triens the bushel. Another, 695, by the same, *de Judiciis*. It called to an account such as had executed a Roman citizen without a judgement of the people and all the formalities of a trial. Another, by the same, to pay no attention to the appearances of the heavens while any affair was before the people. Another, to make the power of the tribunes free in making and proposing laws. Another, to re-establish the companies of artists which had been instituted by Numa, but since his time abolished.

CLODIUS (Publius), a Roman descended of an illustrious family. He made himself famous for his licentiousness, avarice, and ambition. He committed incest with his three sisters, and introduced himself in womens clothes into the house of Julius Cæsar whilst Pompeia, Cæsar's wife, of whom he was enamoured, was celebrating the mysteries of Ceres, where no man was permitted to appear. He was accused for this violation of human and divine laws; but he made himself tribune, and by that means screened himself from justice. He descended from a patrician into a plebeian family to become a tribune. He was such an enemy to Cato, that he made him go with prætorian power, in an expedition against Ptolemy king of Cyprus, that by the difficulty of the campaign he might ruin his reputation, and destroy his interest at Rome during his absence. Cato, however, by his uncommon success frustrated the views of Clodius. He was also an inveterate enemy to Cicero, and by his influence he banished him from Rome, partly on pretence that he had punished with death and without trial the adherents of Cataline. He wreaked his vengeance upon Cicero's house, which he burnt, and set all his goods to sale; which, however, to his great mortification, no one offered to buy. In spite of Clodius, Cicero was recalled and all his goods restored to him. Clodius was some time after murdered by Milo, whose defence Cicero took upon himself.

CLOGHER, an episcopal town of Ireland, in the county of Tyrone, and province of Ulster. It sends two members to parliament. In a very early age an abbey of regular canons, dedicated to the Virgin Mary, was founded here. St Patrick is said to have presided over the church of Clogher; and having appointed St Kertenn to be his successor, he resigned this government, and went to Armagh, where he founded his celebrated abbey. On the 20th of April 1396, a dreadful fire burnt to the ground the church, the two chapels, the abbey, the court of the bishops, and thirty-two other buildings, with all the sacerdotal vestments, utensils, &c. belonging to the bishop's chapter and church. In the year 1610, on the 24th of July, whilst George Montgomery was bishop of Clogher, king James annexed this abbey and its revenues to that see. The see (valued in the king's books at 350 l. *per annum* by extent returned 15th James I.) is reputed to be worthy L. 4000 annually. W. Long. 7. 30. N. Lat. 54. 16.

CLOISTER (*Clastrum*), a habitation surrounded with walls, and inhabited by canons or religious, &c. In a more general sense, cloister is used for a monastery of religious of either sex. In a more restrained sense, cloister is used for the principal part of a regular

Clodius
||
Cloister

Clonmell, ^{Clofe.} gular monastery, confifting of a fquare built around ; ordinarily between the church, the chapter-houfe, and the refectory ; and over which is the dormitory. The cloifters ferved for feveral purpofes in the ancient monafteries. Petrus Blefenfis obferves, that it was here the monks held their lectures : the lecture of morality at the north fide, next the church ; the fchool on the weft, and the chapter on the eaft ; fpiritual meditation, &c. being referved for the church. Lanfranc obferves, that the proper ufe of the cloifter was for the monks to meet in, and converse together, at certain hours of the day.

The form of the cloifter was fquare ; and it had its name *claustrum*, from *claudo*, " I fhut or clofe ;" as being inclofed on its four fides with buildings. Hence, in architecture, a building is ftill faid to be in form of a cloifter, when there are buildings on each of the four fides of the court.

CLONMELL, the affize town of the county of Tipperary in Ireland, is fituated on the river Suir, hath a barrack for two troops of horfe, and is governed by a mayor, recorder, bailiffs, and a town clerk. The river is navigable from this town to Carrick and Waterford ; and there is fome trade carried on here in the woollen branch, particularly by the quakers, who are very numerous in this neighbourhood. There is a fpring here of Spa water, that iffues out of the fide of a rifing ground, that is, notwithstanding, overlooked by a pretty fleep hill, on that fide of the river Suir which is in the county of Waterford. The cures performed by drinking of this water in the feurvy, and other chronic diftempers, drew thither, fome years ago, a great refort of people ; but fafhion, which reigns with an abfolute authority, has brought other waters of late into higher credit. It was in this town that the celebrated and Rev. Laurence Sterne was born, on the 24th of November 1713. The town confifts of four crofs ftreets, and has a fpacious bridge of 20 arches over the river Suir ; the market houfe is ftrong and well built ; and there is a charter fchool here for forty children, to which the late John Dawson, Efq; and Sir Charles Moore, Bart. were confiderable benefactors. A Dominican friary was founded at Clonmell, in 1269, and dedicated to St Dominick. In the fame year Otho de Grandifon erected a Francifcan friary, the church of which was efteemed one of the moft magnificent in Ireland ; in it was kept an image of St Francis, refpecting the miracles wrought by which many marvellous ftories are circulated. This town is very ancient, being built before the invafion of the Danes : it was formerly defended by a fquare wall. Oliver Cromwell, who found more refiftance from this place than any other of his conquelts in the kingdom, demolifhed the caftles and fortifications, of which now only the ruins remain ; the chief Gothic church here is ftill kept in good repair.

CLOSE, in heraldry, When any bird is drawn in a coat of arms with its wings clofe down about it, (*i. e.* not difplayed), and in a ftanding pofture, they blazon it by this word *clofe* ; but if it be flying, they call it *volant*. See **VOLANT**.

CLOSE, in mufic. See **CADENCE**.

CLOSE-HAULED, in navigation, the general arrangement or trim of a fhip's fails when ſhe endeavours to make a progrefs in the neareft direction poffible to-

wards that point of the compafs from which the wind blows. In this manner of failing, the keel commonly makes an angle of fix points with the line of the wind ; but floops and fome other ſmall veffels are faid to fail almoſt a point nearer. All veffels, however, are ſuppoſed to make nearly a point of lee-way when clofe-hauled, even when they have the advantage of a good failing breeze and ſmooth water. The angle of lee-way, however, increaſes in proportion to the increaſe of the wind and ſea. In this diſpoſition of the fails, they are all extended ſideways on the ſhip, ſo that the wind, as it croſſes the ſhip obliquely toward the ſtern from forwards, may fill their cavities. But as the current of winds alſo enters the fails in an oblique direction, the effort of it to make the ſhip advance is conſiderably diminished : ſhe will therefore make the leaſt progrefs when failing in this manner. The ſhip is ſaid to be cloſe-hauled, becauſe at this time her *tacks*, or lower corners of the principal fails, are drawn cloſe down to her ſide to windward, the ſheets hauled cloſe-aft, and all the bow-lines drawn to their greateſt extension to keep the fails ſteady.

CLOSE-Quarters, certain ſtrong barriers of wood, ſtretching acroſs a merchant-ſhip in ſeveral places. They are uſed as places of retreat when a ſhip is boarded by her adverſary, and are therefore fitted with ſeveral ſmall loop-holes through which to fire the ſmall arms, and thereby annoy the enemy and defend themſelves. They are likewise furniſhed with ſeveral caſons called *powder-chests*, which are fixed upon the deck, and filled with powder, old nails, &c. and may be fired at any time from the cloſe-quarters upon the boarders.

We have known an Engliſh merchant ſhip of 16 ^{Falconer's} guns, and properly fitted with cloſe-quarters, defeat ^{Diſt. of the} the united efforts of three French privateers who ^{Marine.} boarded her in the laſt war, after having engaged at ſome diſtance nearly a day and a half, with very few intervals of reſt. Two of the cruizers were equipped with twelve guns each, and the other with eight. The French ſailors were, after boarding, ſo much expoſed to continued fire of muſquetry and coehorns charged with grenadoes, that a dreadful ſcene of carnage enſued, in which the decks were ſoon covered with the dead bodies of the enemy, ſeveral of which the boarders, in their hurry to eſcape, had left behind.

CLOT BIRD : a ſpecies of **FRINGILLA**.

CLOTH, in commerce, a manufacture made of wool, wove in the loom.

Cloths are of diverſe qualities, fine or coarſe. The goodneſs of cloth, according to ſome, conſiſts in the following particulars : 1. That the wool be of a good quality, and well dreſſed. 2. It muſt be equally ſpun, carefully obſerving that the thread of the warp be finer and better twiſted than that of the woof. 3. The cloth muſt be well wrought, and beaten on the loom, ſo as to be every where equally compact. 4. The wool muſt not be finer at one end of the piece than in the reſt. 5. The liſts muſt be ſufficiently ſtrong, of the ſame length with the ſtuff, and muſt conſiſt of good wool, hair, or oſtrich feathers ; or, what is ſtill better, of Daniſh dog's hair. 6. The cloth muſt be free from knots and other imperfections. 7. It muſt be well ſcourd with fuller's earth, well fulled with the beſt white ſoap, and afterwards waſhed in clear water.

Cloſe
Cloth.

Cloth.

water. 8. The hair or nap must be well drawn out with the teazel, without being too much opened. 9. It must be shorn close without making it thread bare. 10. It must be well dried. 11. It must not be tenter-stretched to force it to its just dimensions. 12. It must be pressed cold, not hot pressed, the latter being very injurious to woollen cloth.

Manufacturing of white Cloths which are intended for dyeing. The best wool for the manufacturing of cloths are those of England and Spain, especially those of Lincolnshire and Segovia. To use those wools to the best advantage, they must be scoured, by putting them into a liquor somewhat more than lukewarm, composed of three parts fair water and one of urine. After the wool has continued long enough in the liquor to soak, and dissolve the grease, it is drained and well washed in running water. When it feels dry, and has no smell but the natural one of the sheep, it is said to be duly scoured.

After this, it is hung to dry in the shade; the heat of the sun making it harsh and inflexible: when dry, it is beat with rods upon hurdles of wood, or on cords, to cleanse it from duit and the grosser filth; the more it is thus beat and cleansed, the softer it becomes, and the better for spinning. After beating, it must be well picked, to free it from the rest of the filth that had escaped the rods.

It is now in a proper condition to be oiled, and carded on large iron cards placed slopewise. Olive oil is esteemed the best for this purpose: one fifth of which should be used for the wool intended for the woof, and a ninth for that designed for the warp. After the wool has been well oiled, it is given to the spinners, who first card it on the knee with small fine cards, and then spin it on the wheel, observing to make the thread of the warp smaller by one third than that of the woof, and much compacter twisted.

The thread thus spun, is reeled, and made into skeins. That designed for the woof is wound on little tubes, pieces of paper, or rushes, so disposed as that they may be easily put in the eye of the shuttle. That for the warp is wound on a kind of large wooden bobbins, to dispose it for warping. When warped, it is stiffened with size; the best of which is that made of shreds of parchment; and when dry, is given to the weavers, who mount it on the loom.

The warp thus mounted, the weavers, who are two to each loom, one on each side, tread alternately on the treddle, first on the right step, and then on the left, which raises and lowers the threads of the warp equally; between which they throw transversely the shuttle from the one to the other: and every time that the shuttle is thus thrown, and a thread of the woof inserted within the warp, they strike it conjointly with the same frame, wherein is fastened the comb or reed, between whose teeth the threads of the warp are passed, repeating the stroke as often as is necessary.

The weavers having continued their work till the whole warp is filled with the woof, the cloth is finished: it is then taken off the loom by unrolling it from the beam whereon it had been rolled in proportion as it was wove; and now given to be cleansed of the knots, ends of threads, straws, and other filth, which is done with iron nippers.

In this condition it is carried to the fullery, to be scoured with urine, or a kind of potter's clay, well steeped in water, put along with the cloth in the trough wherein it is fulled. The cloth being again cleared from the earth or urine, is returned to the former hands to have the lesser filth, small straws, &c. taken off as before: then it is returned to the fuller to be beat and fulled with hot water, wherein a suitable quantity of soap has been dissolved; after fulling, it is taken out to be smoothed or pulled by the lifts lengthwise, to take out the wrinkles, crevices, &c.

The smoothing is repeated every two hours, till the fulling be finished, and the cloth brought to its proper breadth: after which it is washed in clear water, to purge it of the soap, and given wet to the carders to raise the hair or nap on the right side with the thistle or weed. After this preparation the cloth-worker takes the cloth, and gives it its first cut or shearing: then the carders resume it, and after wetting, give it as many more courses with the teazel as the quality of the stuff requires, always observing to begin against the grain of the hair, and to end with it; as also to begin with a smoother thistle, proceeding still with one sharper and sharper, as far as the sixth degree.

After these operations, the cloth being dried, is returned to the cloth-worker, who sheers it a second time, and returns it to the carders, who repeat their operation as before, till the nap be well ranged on the surface of the cloth, from one end of the piece to the other.

The cloth thus wove, scoured, napped, and shorn, is sent to the dyer; when dyed, it is washed in fair water, and the worker takes it again wet as it is, lays the nap with a brush on the table, and hangs it on the tenters, where it is stretched both in length and breadth sufficiently to smooth it, set it square, and bring it to its proper dimensions, without straining it too much; observing to brush it afresh, the way of the nap, while a little moist, on the tenters.

When quite dry, the cloth is taken off the tenters, and brushed again on the table, to finish the laying of the nap: after which it is folded, and laid cold under a press, to make it perfectly smooth and even, and give it a gloss.

Lastly, the cloth being taken out of the press, and the papers, &c. for glossing it removed, it is in a condition for sale or use. With regard to the manufacture of mixt cloths, or those wherein the wools are first dyed, and then mixt, spun, and wove of the colours intended, the process, except what relates to the colour, is mostly the same with that just represented.

CLOTH made from Vegetable Filaments. See BARK and FILAMENTS.

Incombustible CLOTH. See ASBESTOS.

CLOTHO, the youngest of the three Parcae, daughters of Jupiter and Themis. She was supposed to preside over the moment that we are born. She held the distaff in her hand, and spun the thread of life, whence her name *κλωστήρ* "to spin." She was represented wearing a crown with seven stars, and covered with a variegated robe.

CLOUD, a collection of vapours suspended in the atmosphere.

Cloth
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Cloud.

Cloud.
Cause of
the forma-
tion of
clouds un-
certain.

That the clouds are formed from the aqueous vapours which before were so closely united with the atmosphere as to be invisible, is universally allowed: but it is no easy matter to account for the long continuance of some very opaque clouds without dissolving; or to give a reason why the vapours, when they have once begun to condense, do not continue to do so till they at last fall to the ground in the form of rain or snow, &c. Under the article BAROMETER, n^o 23. we have hinted at the general cause of the formation of clouds; namely, a separation of the latent heat from the water whereof the vapour is composed. The consequence of this separation, as undeniably proved by Dr. Black, must be the condensation of that vapour, in some degree at least: in such case, it will first appear as a smoke, mist, or fog: which if interposed betwixt the sun and earth, will form a cloud; and the same causes continuing to act, the cloud will produce rain or snow. But though the separation of this latent heat in a certain degree is the immediate cause of the formation of clouds, the remote cause, or the changes produced in the atmosphere, whereby such a separation may be induced, are much more difficult to be discovered. In common observation, we see that vapour is most powerfully condensed by cold substances, such as metals, water, &c. But cold alone cannot in all cases cause the condensation of the atmospherical vapours, otherwise the nights behoved to be always foggy or cloudy, owing to the vapours, raised throughout the day by the heat of the sun, being condensed by the superior coldness of the night. Great rains will happen in very warm weather, when the union of the vapours with the atmosphere ought rather to be promoted than dissolved, if cold was the only agent in their condensation. The serenity of the atmosphere, also, in the most severe frosts, abundantly shows that some other cause besides mere heat or cold is concerned in the formation of clouds, and condensation of the atmospherical vapours.

Not always
owing to
cold.

Electricity
probably
concerned.

The electric fluid is now so generally admitted as an agent in all the great operations of nature, that it is no wonder to find the formation of clouds attributed to it. This hath accordingly been given by S. Beccaria as the cause of the formation of all clouds whatsoever, whether of thunder, rain, hail, or snow. The first, he thinks, are produced by a very great power of electricity, and the others by one more moderate. But though it is certain that all clouds, or even fogs and rain, are electrified in some degree, it still remains a question, whether the clouds are formed in consequence of the vapour whereof they are composed being first electrified, or whether they become electrified in consequence of its being first separated from the atmosphere, and in some measure condensed. This hath not yet, as far as we know, been ascertained by the experiments of Beccaria, or any other person; and indeed, notwithstanding the multitude of electrical discoveries that have lately been made, there seems to be little or no foundation for ascertaining it. Electricity is known to be in many cases a promoter of evaporation; but no experiments have yet been brought to prove, that electrified air parts with its moisture more readily than such as is not electrified; so that, till the properties of electrified air are further investigated, it is

impossible to lay down any rational theory of the formation of clouds upon this principle.

But whether the clouds are produced, *i. e.* the invisible vapours floating in the atmosphere condensed so as to become visible, by means of electricity or not, it is certain that they do contain the electric fluid in prodigious and inconceivable quantities, and many very terrible and destructive phenomena have been occasioned by clouds very highly electrified. The most extraordinary instance of this kind perhaps on record happened in the island of Java in the East Indies in August 1772. On the 11th of that month, at midnight, a bright cloud was observed covering a mountain in the district called *Cheribon*, and at the same time several reports were heard like those of a gun. The people who dwelt upon the upper parts of the mountain not being able to fly fast enough, a great part of the cloud, almost three leagues in circumference, detached itself under them, and was seen at a distance rising and falling like the waves of the sea, and emitting globes of fire so luminous, that the night became as clear as day. The effects of it were astonishing; every thing was destroyed for seven leagues round; the houses were demolished; plantations were buried in the earth; and 2140 people lost their lives, besides 1500 head of cattle, and a vast number of horses, goats, &c.

Cloud.
Clouds of
ten prodigious
electricity.

Terrible
destruction
by an elec-
trified cloud
in Java.

Another instance of a very destructive cloud, the electric qualities of which will at present scarcely be doubted, is related by Mr Brydone, in his Tour through Malta. It appeared on the 29th of October 1757. About three quarters of an hour after midnight, there was seen to the south-west of the city of Melita, a great black cloud, which, as it approached, changed its colour, till at last it became like a flame of fire mixed with black smoke. A dreadful noise was heard on its approach, which alarmed the whole city. It passed over the port, and came first on an English ship, which in an instant was torn in pieces, and nothing left but the hulk; part of the masts, sails, and cordage, were carried to a considerable distance along with the cloud. The small boats and felloques that fell in its way were all broken to pieces and sunk. The noise increased and became more frightful. A sentinel terrified at its approach ran into his box; but both he and it were lifted up and carried into the sea, where he perished. It then traversed a considerable part of the city, and laid in ruins almost every thing that stood in its way. Several houses were laid level with the ground, and it did not leave one steeple in its passage. The bells of some of them, together with the spires, were carried to a considerable distance; the roofs of the churches demolished and beat down, &c. It went off at the north-east point of the city, and demolishing the light-house, is said to have mounted up into the air with a frightful noise; and passed over the sea to Sicily, where it tore up some trees, and did other damage; but nothing considerable, as its fury had been mostly spent at Malta. The number of killed and wounded amounted to near 200; and the loss of shipping, &c. was very considerable.

By another
in the island
of Malta.

The effects of thunder-storms, and the vast quantity of electricity collected in the clouds which produce these storms, are so well known, that it is superfluous to mention them. It appears, however, that even these

Cloud

7
Instance of
two people
involved in
a thunder-
cloud.

8
Height of
the clouds.

† See Thun-
der.

9
Their vari-
ous colours
accounted
for.

10
Of the mo-
tions of
clouds.

these clouds are not so highly electrified as to produce their fatal effects on those who are immersed in them. It is only the discharge of part of their electricity upon such bodies as are either not electrified at all, or not so highly electrified as the cloud, that does all the mischief. We have, however, only the following instance on record, of any person's being immersed in the body of a thunder cloud. Professor Saussure, and young Mr Jalabert, when travelling over one of the high Alps, were caught among clouds of this kind; and to their astonishment found their bodies so full of electrical fire, that spontaneous flashes darted from their fingers with a crackling noise, and the same kind of sensation as when strongly electrified by art.

The height of clouds in general is not great; the summits of very high mountains being commonly quite free from them, as Mr Brydon experienced in his journey up mount *Ætna*: but those which are most highly electrified descend lowest, their height being often not above seven or eight hundred yards above the ground; nay, sometimes thunder-clouds appear actually to touch the ground with one of their edges†: but the generality of clouds are suspended at the height of a mile, or little more, above the earth. Some, however, have imagined them to arise to a most incredible and extravagant height. Maignan of Thoulouse, in his *Treatise of Perspective*, p. 93, gives an account of an exceeding bright little cloud that appeared at midnight in the month of August, which spread itself almost as far as the zenith. He says that the same thing was also observed at Rome; and from thence concludes, that the cloud was a collection of vapours raised beyond the projection of the earth's shadow, and of consequence illuminated by the beams of the sun. This, however, can by no means be credited; and it is much more probable that this cloud owed its splendor to electricity, than to the reflection of the solar beams.

In the evenings after sun-set, and mornings before sun-rise, we often observe the clouds tinged with beautiful colours. They are mostly red: sometimes orange, yellow, or purple; more rarely bluish; and seldom or ever green. The reason of this variety of colours, according to Sir Isaac Newton, is the different size of the globules into which the vapours are condensed. This is controverted by Mr Melville, who thinks that the clouds reflect the sun's light precisely as it is transmitted to them through the atmosphere. This reflects the most refrangible rays in the greatest quantity; and therefore ought to transmit the least refrangible ones, red, orange, and yellow, to the clouds, which accordingly appear most usually of those colours. In this opinion he was greatly confirmed by observing, when he was in Switzerland, that the snowy summits of the Alps turned more and more reddish after sun-set, in the same manner as the clouds; and he imagines that the semitransparency of the clouds, and the obliquity of their situation, tend to make the colours in them much more rich and copious than those on the tops of snowy mountains.

The motions of the clouds, though sometimes directed by the wind, are not always so, especially when thunder is about to ensue. In this case they seem to move very slowly, and often to be absolutely stationary

for some time. The reason of this most probably is, that they are impelled by two opposite streams of air nearly of equal strength; by which means their velocity is greatly retarded. In such cases both the aerial currents seem to ascend to a very considerable height; for Mess. Charles and Roberts, when endeavouring to avoid a thunder-cloud in one of their aerial voyages, could find no alteration in the course of the current, though they ascended to the height of 4000 feet from the surface of the earth. In some cases the motions of the clouds evidently depend on their electricity, independent of any current of air whatever. Thus, in a calm and warm day, we often see small clouds meeting each other in opposite directions, and setting out from such short distances, that we cannot suppose any opposite winds to be the cause. These clouds, when they meet, instead of forming a larger one, become much less, and sometimes vanish altogether; a circumstance undoubtedly owing to the discharge of opposite electricities into each other. This serves also to throw some light on the true cause of the formation of clouds; for if two clouds electrified, the one positively and the other negatively, destroy each other on contact; it follows, that any quantity of vapour suspended in the atmosphere, while it retains its natural quantity of electricity, remains invisible, but becomes a cloud when electrified either *plus* or *minus*. A difficulty, however, still occurs; viz. in what manner a small quantity of vapour surrounded by an immense ocean of the same kind of matter, can acquire either more or less electricity than that which surrounds it: and this indeed we seem not as yet to have any data to solve in a satisfactory manner.

The shapes of the clouds are likewise undoubtedly Their owing to their electricity; for in those seasons in which shapes. a great commotion has been excited in the atmospheric electricity, we shall perceive the clouds assuming strange and whimsical shapes, which vary almost every moment. This, as well as the meeting of small clouds in the air, and vanishing upon contact, is an almost infallible sign of thunder.

Besides the phenomena of thunder, rain, &c. the Connection clouds are intimately connected with those of wind, of the clouds with wind. and always assume a particular shape when a strong continued wind is about to ensue; though it is remarkable, that in the strongest winds we shall often observe them stationary. Sometimes also, on the approach of a cloud, we shall find a sudden and violent gust of wind arise; and at others, the wind, though violent before, shall cease on the approach of a cloud, and recover its strength as soon as the cloud is past. This connection of the clouds with wind is most remarkable in mountainous countries, when the peaks are sufficiently high to have their tops involved in clouds. A very remarkable mountain of this kind is met with at the Cape of Good Hope, from the clouds on whose top, according to the relations of travellers, the winds issue forth as if they had been confined in a bag; and something similar has been observed of mountains in other parts of the world.

The uses of the clouds are evident; as from them Their uses. proceeds the rain which refreshes the earth; and without which, according to the present system of nature, the whole surface of the earth must be a mere desert.

They

Clove
||
Clovis.

They are likewise of great use as a screen interposed between the earth and the scorching rays of the sun, which are often so powerful as to destroy the grass and other tender vegetables. In the more secret operations of nature also, where the electrical fluid is concerned, the clouds bear a principal share; and serve especially as a medium for conveying that fluid from the atmosphere into the earth, and from the earth into the atmosphere: in doing which, when electrified to a great degree, they sometimes produce very terrible effects; of which instances have been already given.

CLOVE-TREE, in botany. See CARYOPHYLLUS.

CLOVE, a term used in weights of wool. Seven pounds make a clove. In Essex, eight pounds of cheese and butter go to the clove.

CLOVE *July-flower*. See DIANTHUS.

CLOVER-GRASS, in botany. See TRIFOLIUM; and AGRICULTURE, n° 177, 179.

CLOUGH, or DRAUGHT, in commerce, an allowance of two pounds in every hundred weight for the turn of the scale, that the commodity may hold out weight when sold out by retail.

CLOVIO (Giorgio Giulio), history and portrait painter, was born in Slavonia in 1498. Having in the early part of his youth applied himself to literature, his genius prompted him to pursue the art of painting for a profession: and at 18 years of age he went to Rome, where he spent three years to perfect his hand in drawing, and devoted himself entirely to painting in miniature. His knowledge of colouring was established by the instructions of Julio Romano, and his taste of composition and design was founded on the observations he made on the works of Michael Angelo Buonaroti. By those assistances he proceeded to such a degree of excellence in portrait as well as in history, that in the former he was accounted equal to Titian, and in the latter not inferior to Buonaroti. He died in 1578. His works are exceedingly valuable, and are at this day numbered among the curiosities of Rome. Vafari, who had seen the wonderful performances of Clovio with inexpressible astonishment, enumerates many of his portraits and historical compositions, and seems to be almost at a loss for language sufficiently expressive of their merit. He mentions two or three pictures on which the artist had bestowed the labour of nine years: but the principal picture represented Nimrod building the Tower of Babel; which was so exquisitely finished, and so perfect in all its parts, that it seemed quite inconceivable how the eye or the pencil could execute it. He says it is impossible to imagine any thing so admirably curious; whether one considers the elegance of the attitudes, the richness of the composition, the delicacy of the naked figures, the perspective proportion of the objects, the tender distances, the scenery, the buildings, or other ornaments; for every part is beautiful and inimitable. He also takes notice of a single ant introduced in one of the pictures of this master; which, though exceedingly and incredibly small, is yet so perfect, that even the most minute member was as distinct as if it had been painted of the natural size.

CLOVIS I. was the real founder of the French monarchy; for he was the first conqueror of the several provinces of Gaul, possessed before his time by the Romans, Germans, and Goths. These he united to the

then scanty dominions of France, removed the seat of government from Scissions to Paris, and made this the capital of his new kingdom. He died in 511, in the 46th year of his age and 31st of his reign. See (*Hist. of*) FRANCE.

CLOUTS, in gunnery, are thin plates of iron nailed on that part of the axle-tree of a gun-carriage which comes through the nave, and through which the linspin goes.

CLOYNE, a town of Ireland, in the county of Cork and province of Munster. W. Long. 8. o. N. Lat. 51. 40. It is but a small place, though an episcopal residence. A church was built, and a bishopric erected here, by St Colman, who died on the 4th of November 604; and in 707 an abbey was also founded here. In 1430, the bishopric was united to that of Cork; and the union continued till the 11th of November 1638, when Dr George Synge was consecrated bishop of Cloyne; since which time this see has been governed by its own prelates, one of whom was the celebrated BERKELEY.—This see is not taxed in the king's books; but is now reputed to be worth L.2500 a-year.—The chapter of Cloyne is composed of a dean, chanter, chancellor, treasurer, an archdeacon, and fourteen prebendaries. The diocese is divided into four rural deaneries, and the collegiate church of St Mary of Youghal is united to the bishopric. The cathedral is a decent Gothic building. The nave is about 120 feet long; having lateral aisles, besides the cross aisles, divided by Gothic arches, five on each side. In the choir there is an excellent organ. The bishop's palace, which was rebuilt at the beginning of the present century, is large and convenient. To the north-west of Cloyne is a reputed holy well, dedicated to St Colman, which is much frequented on the 24th of November, being the patron-day.

CLUE OF A SAIL, the lower corner; and hence

CLUE-GARNETS, are a sort of tackles fastened to the clues, or lower corners of the main-sail or fore-sail, to truss them up to the yard as occasion requires, which is usually termed *clueing up the sails*.

CLUE-Lines are for the same purpose as clue-garnets: only that the latter are confined to the courses, whereas the former are common to all the square sails. See these ropes as represented in the article SHIP.

CLUNIA (anc. geog.), a principal town of the Hither Spain, a Roman colony, with a *conventus juridicus*, on the Durius, to the west of Numantia. Now *Corunna del Conde*.

CLUNIUM (anc. geog.), a town of Corsica, near Bastia. Now *St Catharine*.

CLUNY, or CLOGNY, a celebrated abbey of Benedictine monks, in a city of that name; being the head or chief of a congregation denominated from them.

It is situated in the Maconnais, a little province of France, on the river Grône; and was founded by William Duke of Berry and Aquitaine; or, as others say, by the Abbot Bernon, supported by that Duke, in the year 910.

This abbey was anciently so very spacious and magnificent, that in 1245, after the holding of the first council of Lyons, Pope Innocent IV. went to Cluny, accompanied with the 2 patriarchs of Antioch and Constantinople, 12 Cardinals, 3 archbishops, 15 bishops, and a great number of abbots; who were all entertained,

Clouts
||
Cluny.

Clupea.

tained, without one of the monks being put out of their place: tho' S. Louis, Q. Blanche his mother, the Duke of Artois his brother, and his sister, the Emperor of Constantinople, the sons of the kings of Arragon and Castile, the Duke of Burgundy, 6 counts, and a great number of lords, with all their retinues, were there at the same time.

Cluny, at its first erection, was put under the immediate protection of the apostolic see; with express prohibition to all secular and ecclesiastic powers, to disturb the monks in the possession of their effects, or the election of their abbot. By this they pretended to be exempted from the jurisdiction of bishops: which at length gave the hint to other abbeys to insist on the same.

Cluny is the head of a very numerous and extensive congregation: in effect, it was the first congregation of divers monasteries united under one chief, so as only to constitute one body, or, as they call it, one order, that ever arose.

This order of monks was brought into England by William Earl of Warren, son-in-law to William the Conqueror, who built a house for them at Lewes in Sussex about the year 1077. There were 27 priories and cells of this order in England, which were governed by foreigners, afterwards made denizens.

CLUPEA, or HERRING, in ichthyology, a genus belonging to the order of abdominales. The upper jaw is furnished with a serrated mystache; the branchiostegic membrane has eight rays; a scaly serrated line runs along the belly from the head to the tail; and the belly-fins have frequently nine rays. There are 11 species, viz.

1. The harengus, or common herring, has no spots, and the under jaw is longer than the upper one. A herring dies immediately after it is taken out of the water; whence the proverb arises, *As dead as a herring*. The meat is every where in great esteem, being fat, soft, and delicate; especially if it is dressed as soon as caught, for then it is incomparably better than on the next day.

The herring was unknown to the ancients. Notwithstanding the words *χαλκιδι* and *μαρινι* are by translators rendered *halec*, the characters given to those fish are common to such numbers of different species as render it impossible to say which they intended.

1
Herrings,
where
found.

Herrings are found from the highest northern latitudes yet known, as low as the northern coasts of France: and except one instance, brought by Dod, of a few being once taken in the bay of Tangier, none are ever found more southerly. They are met with in vast shoals on the coast of America, as low as Carolina. In Chesapeake-bay is an annual inundation of those fish, which cover the shore in such quantities as to become a nuisance. We find them again in the seas of Kamptschatka, and probably they reach Japan; for Kempfer mentions, in his account of the fish of that country, some that are congenerous. The great winter rendezvous of the herring is within the arctic circle: there they continue for many months in order to recruit themselves after the fatigue of spawning; the seas within that space swarming with insect food in a far greater degree than those of our warmer latitudes.

2
Immense
shoal of
them.

This mighty army begins to put itself in motion in the spring: we distinguish this vast body by that name;

for the word *herring* comes from the German *beer*, Clupea. "an army," to express their numbers. They begin to appear off the Shetland isles in April and May; these are only the forerunners of the grand shoal which comes in June; and their appearance is marked by certain signs, by the numbers of birds, such as gannets and others, which follow to prey on them; but when the main body approaches, its breadth and depth is such as to alter the appearance of the very ocean. It is divided into distinct columns of five or six miles in length, and three or four in breadth, and they drive the water before them with a kind of rippling: sometimes they sink for the space of ten or fifteen minutes, and then rise again to the surface; and in fine weather reflect a variety of splendid colours like a field of the most precious gems; in which, or rather in a much more valuable, light should this stupendous gift of Providence be considered by the inhabitants of the British isles.

The first check this army meets in its march southward is from the Shetland isles, which divide it into two parts; one wing takes to the east, the other to the western shores of Great Britain, and fill every bay and creek with their numbers; others pass on towards Yarmouth, the great and ancient mart of herrings: they then pass through the British Channel, and after that, in a manner disappear. Those which take towards the west, after offering themselves to the Hebrides, where the great stationary fishery is, proceed to the north of Ireland, where they meet with a second interruption, and are obliged to make a second division; the one takes to the western side, and is scarce perceived, being soon lost in the immensity of the Atlantic; but the other, that passes into the Irish sea, rejoices and feeds the inhabitants of most of the coasts that border on it. These brigades, as we may call them, which are thus separated from the greater columns, are often capricious in their motions, and do not show an invariable attachment to their haunts.

Were we inclined to consider this partial migration in a moral light, we might reflect with veneration and awe on the mighty power which originally impressed on this most useful body of his creatures the instinct that directs and points out the course, that blesses and enriches these islands, which causes them, at certain and invariable times, to quit the vast polar deeps, and offer themselves to our expecting fleets. That benevolent Being has never been known, from the earliest account of time, once to withdraw this blessing from the whole; though he often thinks proper to deny it to particulars, yet this partial failure (for which we see no natural reason) should fill us with the most exalted and grateful sense of his Providence for impressing such an invariable and general instinct on these fish towards a southward migration when the whole is to be benefited, and to withdraw it when only a minute part is to suffer.

This instinct was given them, that they might remove for the sake of depositing their spawn in warmer seas, that would mature and vivify it more assuredly than those of the frozen zone. It is not from defect of food that they set themselves in motion; for they come to us full of fat, and on their return are almost universally observed to be lean and miserable. What their food is near the Pole we are not yet informed;

but

Clupea, but in our seas they feed much on the *oniscus marinus*, a crustaceous insect, and sometimes on their own fry.

They are full of roe in the end of June, and continue in perfection till the beginning of winter, when they deposit their spawn. The young herrings begin to approach the shores in July and August, and are then from half an inch to two inches long: those in Yorkshire are called *herring file*. Though we have no particular authority for it, yet as very few young herrings are found in our seas during winter, it seems most certain that they must return to their paternal haunts beneath the ice, to repair the vast destruction of their race during summer by men, fowl, and fish. Some of the old herrings continue on our coast the whole year: the Scarborough fishermen never put down their nets but they catch a few: but the numbers that remain are not worth comparison with those that return. See *Herring-FISHERY*.

The Dutch are most extravagantly fond of this fish when it is pickled. A premium is given to the first burs that arrives in Holland with a lading of this their ambrosia, and a vast price given for each keg. There is as much joy among the inhabitants on its arrival, as the Egyptians show on the first overflowing of the Nile. Flanders had the honour of inventing the art of pickling herrings. One William Beuklen of Biverlet, near Sluys, hit on this useful expedient: from him was derived the name *pickle*, which we borrow from the Dutch and German. Beuklen died in 1397. The emperor Charles V. held his memory in such veneration for the service he did to mankind, as to do his tomb the honour of a visit. It is very singular that most nations give the name of their favourite dish to the facetious attendant on every mountebank. Thus the Dutch call him *pickle herring*; the Italians, *macaroni*; the French, *jean pottage*; the Germans, *hans wurst*, that is, *jack sausage*; and the English dignify him with the name of *jack pudding*.

2. The *sprattus* has 13 rays in the back fin. It is a native of the European seas, and has a great resemblance to the herring, only it is of a less size. They come into the river Thames below bridge in the beginning of November, and leave it in March; and are, during that season, a great relief to the poor of the capital. At Gravesend and at Yarmouth they are cured like red herrings: they are sometimes pickled, and are little inferior in flavour to the anchovy, but the bones will not dissolve like those of the latter.

3. The *alosa*, or *shad*, has a forked snout, and black spots on the sides. According to Belonius and Hafselquist, this is a fish of passage in the Nile. The last says it is found in the Mediterranean near Smyrna, and on the coast of Egypt near Rosetto; and that in the months of December and January it ascends the Nile as high as Cairo, where the people stuff it with pot marjoram; and when dressed in that manner, it will very nearly intoxicate the eater. In Great Britain the Severn affords this fish in higher perfection than any other river. It makes its first appearance there in May, but in very warm seasons in April; for its arrival sooner or later depends much on the temper of the air. It continues in the river about two months, and then is succeeded by a variety which we shall have occasion to mention hereafter.

The Severn shad is esteemed a very delicate fish about the time of its first appearance, especially in that part of the river that flows by Gloucester, where they are taken in nets, and usually sell dearer than salmon: some are sent to London, where the fishmongers distinguish them from those of the Thames by the French name *alose*. Whether they spawn in this river and the Wye is not determined, for their fry has not yet been ascertained. The old fish come from the sea into the river in full roe. In the months of July and August, multitudes of bleak frequent the river near Gloucester; some of them are as big as a small herring, and these the fishermen erroneously suppose to be the fry of the shad. Numbers of these are taken near Gloucester, in those months only, but none of the emaciated shad are ever caught in their return.

The Thames shad does not frequent the river till the latter end of May or beginning of June, and is esteemed a very coarse and insipid sort of fish. The Severn shad is sometimes caught in the Thames, though rarely, and called *allis* (no doubt *alose*, the French name) by the fishermen in that river. About the same time, and rather earlier, the variety called, near Gloucester, the *twait*, makes its appearance; and is taken in great numbers in the Severn, and is held in as great disrepute as the shad of the Thames. The differences between each variety are as follow: the true shad weighs sometimes eight pounds; but their general size is from four to five. The *twait*, on the contrary, weighs from half a pound to two pounds, which it never exceeds. The *twait* differs from a shad only in having one or more round black spots on the sides: if only one, it is always near the gill; but commonly there are three or four, placed one under the other.

4. The *encrascolus*, or *anchovy*, has its upper jaw longer than the under one, and is about three inches long. They are taken in vast quantities in the Mediterranean, and are brought over here pickled. The great fishery is at Georgia a small isle west of Leghorn. See *Anchovy-FISHERY*.

The other species are, 5. The atherinoids has a shining line on each side, and small belly-fins. It is a native of Surinam. 6. The thrissa has 28 rays in the fin at the anus. It is found in the Indian ocean. 7. The sima has yellow fins, those of the belly being very small. The mouth is flat; the upper jaw is very short; the body is of a shining silver colour; and the fins are yellow. It is a native of Asia. 8. The sternicla has no belly-fins, and the body is broad. It is a native of Surinam. 9. The mystus is shaped like a sword, and the fins at the anus are united. It is found in the Indian ocean. 10. The tropica has a wedge-like tail, and a white, broad, compressed body. It is found at Ascension island. 11. The sinensis is very like the common herring, but broader. It has no teeth, and is a native of China.

CLUSIA, the BALSAM-TREE: A genus of the monogynia order, belonging to the polygamia class of plants; and in the natural method ranking under those plants the order of which is doubtful. The calyx is tetraphyllous or hexaphyllous, with its leaflets opposite and imbricated; the corolla tetrapetalous or hexapetalous; the stamina numerous. The calyx and corolla of the female as in the male; the nectarium

Clusina
||
Clutia.

rium of antheræ or glandules coalited, including the germen. The capsule is quinquelocular, quinquevalved, and full of pulp. There are four species, all natives of America. The most remarkable is the flava. This is pretty common in the British America islands, where the trees grow to the height of 20 feet, and shoot out many branches on every side, furnished with thick, round, succulent leaves placed opposite. The flowers are produced at the ends of the branches, each having a thick succulent cover. After the flowers are past, they are succeeded by oval fruit. From every part of these trees there exudes a kind of turpentine, which is called in the West Indies *hog-gum*; because they say, that when any of the wild hogs are wounded, they repair to these trees, and rub their wounded parts against the stem till they have anointed themselves with this turpentine, which heals their wounds. These plants are very tender, and in this country must be kept constantly in a stove; and sparingly watered, especially in winter; for they naturally grow in those parts of the islands where it seldom rains, and consequently cannot bear much moisture. They may be propagated from cuttings, which must be laid to dry for a fortnight or three weeks, that the wounded parts may be healed over, otherwise they will rot. The best time for planting these cuttings is in July, that they may be well rooted before the cold weather comes on in autumn.

CLUSINA PALUS (anc. geog.), a lake of Tuscany, extending north-west, between Clusium and Arretium, and communicating with the Arnus and Clanis. Now *Chiana Palude*.

CLUSINI FONTES, (Horace), baths in Tuscany, in the territory of Clusium, between this last to the north, and Acula to the south, at the distance of eight miles from each. Now *Bagni di S. Casciana*.

CLUSIUM, anciently called *Gamars* (Virgil, *Liwy*); a town of Tuscany, at the south end of the Palus Clusina, where it forms the Clanis; the royal residence of Porsena, three days journey from Rome to the north, (Polybius). *Clusinus* the epithet. *Clusini Veteres* the people. Now *Chiufi*. E. Long. 13. Lat. 43.—*Clusium Novum*, was a town of Tuscany, near the springs of the Tiber, in the territory of Arretium; where lies the Ager Clusinus; now called *Casentino*. *Clusini Novi*, the people, (Pliny).

CLUTIA, in botany: A genus of the gynandria order, belonging to the diœcia class of plants; and in the natural method ranking under the 38th order, *Tri-cocca*. The male calyx is pentaphyllous, the corolla pentapetalous: the calyx and corolla of the female as in the male; the styles are three, and the capsule is trilocular with a single seed. There are three species, all of them natives of warm climates. They are evergreen shrubby plants, rising six or eight feet high, garnished with simple leaves, and greenish-white quinquepetalous flowers. They are propagated by cuttings in spring or summer, planting them in pots of light earth, plunged in a hot-bed. The plants must always be kept in a stove.

Dr Wright, in his account of the medicinal plants of Jamaica, says that the *clusa clutheria* is the same as the *cascarilla* and *eleatheria* of the shops. Other medical writers have supposed them to be distinct barks, and they are sold in the shops as different pro-

ductions. Linnæus's *croton cascarilla*, Dr Wright observes, is the wild rosemary shrub of Jamaica, the bark of which has none of the sensible qualities of the *cas-carilla*.

CLUVIER (Philip), in Latin *Cluverius*, a celebrated geographer, born at Dantzic in 1580. He travelled into Poland, Germany, and the Netherlands, in order to study law; but, being at Leyden, Joseph Scaliger persuaded him to give way to his genius for geography. Cluvier followed his advice, and for this purpose visited the greatest part of the European states. He was well versed in many languages; and wherever he went, obtained illustrious friends and protectors. At his return to Leyden, he taught there with great applause; and died in 1623, aged 43. He wrote, 1. *De tribus Rheni alveis*. 2. *Germania antiqua*. 3. *Sicilia antiqua*. 4. *Italia antiqua*. 5. *Introductio in universam Geographiam*. All justly esteemed.

CLYDE, a river in Scotland, which, arising in Annandale, falls into the sea over against the isle of Bute. Next to the Tay, it is the largest river in Scotland; and is navigable for small craft up to Glasgow. The canal, which joins the Forth, † falls into it a little below that city. The cataract called the *Frith of the Clyde*, opposite to Lanark, is a great natural curiosity, and the first scene of the kind in Great Britain. This tremendous sheet of water for about a mile falls from rock to rock. At Stone-byers, the first fall is about 60 feet; the last, at Cory-Lynn, is over solid rock, not less than 100 feet high. At both these places this great body of water exhibits a grander and more interesting spectacle than imagination can possibly conceive.

At Cory-Lynn, the falls are seen to most advantage from a ruinous pavilion in a garden, placed in a lofty situation. The cataract is full in view, seen over the tops of trees and bushes, precipitating itself, for an amazing way, from rock to rock, with short interruptions, forming a rude slope of furious foam. The sides are bounded by vast rocks, clothed on their tops with trees: on the summit and very verge of one is a ruined tower, and in front a wood over-topped by a verdant hill. A path conducts the traveller down to the beginning of the fall, into which projects a high rock, in floods insulated by the water; and from the top is a tremendous view of the furious stream. In the cliffs of this savage retreat the brave Wallace is said to have concealed himself, meditating revenge for his injured country.

On regaining the top, the walk is formed near the verge of the rocks; which on both sides are perfectly mural and equidistant, except where they overhang: the river is pent up between them at a distance far beneath; not running, but rather sliding along a stoney bottom sloping the whole way. The summits of the rock are wooded; the sides smooth and naked; the strata narrow and regular, forming a stupendous natural masonry. After a walk of above half a mile on the edge of this great chasm, on a sudden appears the great and bold fall of Boniton, in a foaming-sheet, far-projecting into a hollow, in which the water shows a violent agitation, and a wide extending mist arises from the surface. Above that is a second great fall; two lesser succeed: beyond them the river winds, grows more tranquil, and is seen for a considerable way bounded

Cluvier,
Clyde.

† See the
articles
Forth and
Canal.

Clymene bounded on one side by wooded banks, on the other by rich and swelling fields.

Clytia.

The great fall of Stone-byers, first mentioned, has more of the horrible in it than any of the others, and is seen with more difficulty: it consists of two precipitous cataracts falling one above the other into a vast chasm, bounded by lofty rocks, forming an amazing theatre to the view of those who take the pains to descend to the bottom. Between this and Cory-Lynn there is another fall called *Dundoffin*.

CLYMENE, in fabulous history, the daughter of Oceanus: who, being beloved by Apollo, he had by her Phaëton, Lampatia, Egle, and Phebe. See **PHAE-TON**.

CLYPEOLA, TREACLE-MUSTARD: A genus of the filiculosa order, belonging to the tetradynamia class of plants; and in the natural method ranking under the 39th order, *Siliquosæ*. The silicula is emarginated, orbiculated, compressed plane, and deciduous. There are two species, both natives of France, Italy, and the warm parts of Europe, but hardy enough to bear the winters in this country. One of them is an annual, and the other a perennial plant; both are low and herbaceous, bearing spikes of white flowers. They are propagated by seeds, which should be sown in autumn where they are to remain.

CLYSSUS, an extract prepared, not from one, but several bodes mixed together: and, among the moderns, the term is applied to several extracts prepared from the same body, and then mixed together.

CLYSTER, is a liquid remedy, to be injected chiefly at the anus into the larger intestines. It is usually administered by the bladder of a hog, sheep, or ox, perforated at each end, and having at one of the apertures an ivory pipe fastened with pack-thread. But the French, and sometimes the Dutch, use a pewter syringe, by which the liquor may be drawn in with more ease and expedition than in the bladder, and likewise more forcibly expelled into the large intestines. This remedy should never be administered either too hot or too cold, but tepid; for either of the former will be injurious to the bowels.

Clysters are sometimes used to nourish and support a patient who can swallow little or no aliment, by reason of some impediment in the organs of deglutition, in which case they may be made of broth, milk, ale, and decoctions of barley and oats with wine. The English introduced a new kind of clyster, made of the smoke of tobacco, which has been used by several other nations, and appears to be of considerable efficacy when other clysters prove ineffectual, and particularly in the iliac passion, in the *hernia incarcerata*, and for the recovery of drowned persons.

CLYTEMNESTRA, in fabulous history, the daughter of Jupiter and Leda. She married Agamemnon; but while that prince was at the siege of Troy, she had an amorous intrigue with Ægisthus, whom she engaged to murder Agamemnon at his return to his dominions. Her son Orestes, however, revenged the death of his father by killing Ægisthus, with his mother Clytemnestra; but was afterwards haunted by the Furies as long as he lived.

CLYTIA, or **CLYTIE**, daughter of Oceanus and Tethys, beloved by Apollo. She was deserted by her

lover, who paid his addresses to Leucothoe; and this so irritated her, that she discovered the whole intrigue to her rival's father. Apollo despised her the more for this; and she pined away, and was changed into a flower, commonly called a *sun-flower*, which still turns its head towards the sun in his course in token of her love.

CNEORUM, WIDOW-WAIL: A genus of the monogynia order, belonging to the triandria class of plants; and in the natural method ranking under the 38th order, *Tricocceæ*. The calyx is tridentated; there are three equal petals, and a tricoccous berry. There is but one species, a little evergreen and very ornamental shrub, adorned with simple leaves, and tripetalous flowers of a pale yellow colour. It is propagated from seeds, and requires no other care than to be kept free from weeds.

CNICUS, BLESSED THISTLE: A genus of the polygania æqualis order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The calyx is ovate, imbricated with spinous-branched scales, and encircled with bractææ. The florets are equal. There are seven species, of which the only remarkable one is that used in medicine under the name of *carduus benedictus*. This is an annual plant cultivated in gardens: it flowers in June and July, and perfects its seeds in autumn. For medical purposes the plant should be gathered when in flower, dried in the shade, and kept in a very dry airy place, to prevent its rotting or growing mouldy, which it is very apt to do. The leaves have a penetrating bitter taste, not very strong or durable, accompanied with an ungrateful flavour, which they are in a great measure freed from by keeping. Water extracts in a little time, even without heat, the lighter and more grateful parts of this plant; if the digestion is continued for some hours, the disagreeable parts are taken up; a strong decoction is very nauseous and offensive to the stomach. Rectified spirit gains a very pleasant bitter taste, which remains uninjured in the extract. The virtues of this plant are little known in the present practice. The nauseous decoction is sometimes used to provoke vomiting; and a strong infusion to promote the operation of other emetics. But this elegant bitter, when freed from the offensive parts of the herb, may be advantageously applied to other purposes. Dr Lewis informs us, that he has experienced excellent effects from a light infusion of carduus in loss of appetite, where the stomach was injured by irregularities. A stronger infusion made in cold or warm water, if drunk freely, and the patient kept warm, occasions a plentiful sweat, and promotes all the secretions in general. The seeds of the plant are also considerably bitter, and have sometimes been used with the same intention as the leaves.

CNIDUS, (anc. geog.) a Greek town of Caria; situated on a horn or promontory of a peninsula. It had in front a double port, and an island lying before it in form of a theatre, which being joined to the continent by moles or causeways, made *Cnidus* a Dipolis or double town (Strabo); because a great number of Cnidians inhabited the island. Pausanias mentions a bridge which joined the island to the continent.—*Cnidii*, the people. *Cnidius*, the epithet.—*Cnidia Venus*, a principal divinity of the Cnidians, (Horace).

Cneorum
||
Cnidus.

Her

Cnossus,
Coach.

Her statue was executed by Praxiteles; and so exquisitely done, and so much admired, that people came from all parts to view it (Pliny). Of this place was Eudoxus, the famous astronomer and geometrician, who had here an observatory, (Strabo.)

CNOSSUS, or Cnosus, anciently called *Geratos*, from a cognominal river running by it; a city of Crete, 23 miles to the east of Gortina (Peutinger). Here stood the sepulchre of Jupiter, the famous labyrinth, and the palace of Minos a very ancient king; here happened the adventure of Ariadne his daughter with Theseus called *Gnosfis* (Ovid). Its port-town was Heracleum, on the east side of the island.

COACH, a vehicle for commodious travelling suspended on leathers, and moved on wheels. In Britain, and throughout Europe, the coaches are drawn by horses, except in Spain, where they use mules. In a part of the east, especially the dominions of the great Mogul, their coaches are drawn by oxen. In Denmark they sometimes yoke rein-deer in their coaches; though rather for curiosity than use. The coachman is ordinarily placed on a seat raised before the body of the coach. But the Spanish policy has displaced him in that country by a royal ordonnance; on occasion of the Duke d'Olivares, who found that a very important secret, whereon he had conferred in his coach, had been overheard and revealed by his coachman; since that time the place of the Spanish coachman is the same with that of the French stage-coachman and our postilion, viz. on the first horse on the left.

The invention of coaches is owing to the French; yet coaches are not of any great antiquity, even in France, scarce reaching beyond the reign of their Francis I. Their use, at their first rise, was only for the country: and authors observe, as a thing very singular, that there were at first no more than two coaches in Paris; the one that of the queen, and the other that of Diana natural daughter of Henry II. The first courtier who had one was Jean de Laval de Bois Dauphin; whose enormous bulk disabled him from travelling on horseback. One may hence judge how much variety, luxury, and idleness, have grown upon our hands in later days; there being now computed in that same city no less than 15,000 coaches.

Coaches have had the fate of all other inventions, to be brought by degrees to their perfection; at present they seem to want nothing, either with regard to ease or magnificence. Louis XIV. of France made several sumptuary laws for restraining the excessive richness of coaches, prohibiting the use of gold, silver, &c. therein; but they have had the fate to be neglected.

By the act 25 Geo. III. c. 47. former duties on coaches, &c. are repealed, and the following charged in lieu thereof, namely: For every coach, berlin, landau, chariot, calash, with four wheels, chaise marine, chaise with four wheels, and caravan, or by whatever name such carriages may be called, kept by any person for his own use, or to be let out to hire (except hackney coaches), shall be paid the yearly sum of L. 7. And for every calash, chaise, chair, gig, or whiskey, or by whatever name they are known or called, having two or three wheels, to be drawn by one or more horses, that shall be kept by any person for his own use, or to be let out to hire, the yearly sum of L. 3. 10s.

Every maker of coaches, chaise, chariots, &c. must,

from and after the fifth day of July 1785, take out at the excise office in London, or of their agents in the country, a licence to be renewed annually at least ten days before the expiration of the former, for which they must pay 20s. They must also pay 20s. duty for every four-wheeled carriage newly built for sale, and 10s. for every two-wheeled carriage. These duties are also payable to the commissioners of the excise in town, or their agents in the country.

Coach-makers in Scotland are to take out their licences and pay the duties to the commissioners of excise in Edinburgh, or their agents in the country of that part of Great Britain.

Every coach-maker neglecting to take out a licence, and renewing the same annually, forfeits L. 10; and neglecting or refusing to settle every six weeks, in the manner particularly directed by the act, is a forfeiture of L. 20.

Hackney-Coaches, those exposed to hire, in the streets of London, and some other great cities, at rates fixed by authority.

One thousand hackney-coaches are allowed in London and Westminster; which are to be licensed by commissioners, and to pay a duty to the crown. They are all numbered, having their numbers engraved on tin plates fixed on the coach-doors. Their fares or rates are fixed by act of parliament; and by a late act have been increased in consequence of a new weekly tax.

Stage-Coaches, are those appointed for the conveyance of travellers from one city or town to another. The masters of stage-coaches are not liable to an action for things lost by their coachmen, who have money given them to carry the goods, unless where such master takes a price for the same.

Persons keeping any coach, berlin, landau, or other carriage with four wheels, or any calash, chaise, chair, or other carriage with two wheels, to be employed as public stage-coaches, or carriages for the purpose of conveying passengers for hire to and from different places, shall pay annually 5s. for a licence; and no person so licensed shall by virtue of one licence keep more than one carriage, under the penalty of L. 10.

Mail-Coaches, are stage-coaches of a particular construction to prevent overturns; and for a certain consideration carry his Majesty's mails, which are protected by a guard, and subject to the regulations of the post-office. They are pointed as to their time of arrival and departure, are restricted to four inside passengers, and from experience have proved very beneficial to the commerce and correspondence of this country. John Palmer, Esq; who has the merit of the invention, and been indefatigable in bringing the establishment to a permanent footing, has been greatly patronised by government; and got, as the reward of his service, a handsome appointment in the general post-office London.

COACH or *COUCH*, is also a sort of chamber or apartment in a large ship of war near the stern. The floor of it is formed by the aftmost part of the quarter-deck, and the roof of it by the poop: it is generally the habitation of the captain.

COADUNATE, in botany, an order of plants in the *fragmenta methodi naturalis* of Linnaeus, in which he has these genera, viz. annona, liriodendrum, magnolia, uvaria, michelia, thea.

COAGULATION, in chemistry, is performed by fix

Coach
||
Coagulation.

Coagulum fix different agents; and by each of these in several different manners. 1. It is performed with water, by congealing, crystallizing, and precipitating, as in the *mercurius vitæ* and some other preparations. 2. With oil, which, by the force of fire, unites with sulphur, salts, and metals. 3. With alcohol, upon the spirit of sal ammoniac, the white of eggs, the serum of the blood, &c. 4. With acid and alkali growing solid together, as in the *tartarum vitriolatum*. 5. With fixed alkali, as in milk. And, 6. With acid salts; as in milk, serum, and the whites of eggs.

COAGULUM, is the same with what in English we call *runnet*, or rather the curd formed thereby.

COAKS. For the exciting of intense heats, as for the smelting of iron ore, and for operations where the acid and oily particles would be detrimental, as the drying of malt, fossil-coals are previously charred, or reduced to *coaks*; that is, they are made to undergo an operation similar to that by which charcoal is made. By this operation coals are deprived of their phlegm, their acid liquor, and part of their fluid oil. Coaks, therefore, consist of the two most fixed constituent parts, the heavy oil and the earth, together with the acid concrete salt, which, though volatile, is dissolved by the oil and the earth.

COAL, among chemists, signifies any substance containing oil, which has been exposed to the fire in close vessels, so that all its volatile principles are expelled, and that it can sustain a red heat without further decomposition. Coal is commonly solid, black, very dry, and considerably hard. The specific character of perfect coal is its capacity of burning with access of air, while it becomes red-hot and sparkles, sometimes with a sensible flame which gives little light, with no smoke or foot capable of blackening white bodies.

Coal is capable of communicating its inflammable principle, either to the vitriolic acid with which it forms sulphur; or to the nitrous acid contained in nitre, which it inflames; or to metallic earths, which it reduces into metals. But the phlogiston cannot pass from coal to form these new combinations without the assistance of red-heat. Coal seems to be an unalterable compound in every instance, but those mentioned of burning in the open air, and of communicating its phlogiston to other bodies: for it may be exposed in close vessels to the most violent and long continued fire without suffering the least decomposition. No disposition to fuse, nor any diminution of weight, can be perceived. It is a substance exceedingly fixed, and perhaps the most refractory in nature. It resists the action of the most powerful menstrua, liver of sulphur alone excepted. Coal is evidently a result of the decomposition of the compound bodies from which it is obtained. It consists of the greatest part of the earthy principle of these compound bodies, with which a part of the saline principles, and some of the phlogiston of the decomposed oil, are fixed and combined very intimately. Coal can never be formed but by the phlogiston of a body which has been in an oily state: hence it cannot be formed by sulphur, phosphorus, metals, nor by any other substance the phlogiston of which is not in an oily state. Also every oily matter treated with fire in close vessels, furnishes true coal; so that whenever a charry residuum is left, we may be certain

that the substance employed in the operation contained oil. Lastly, the inflammable principle of coal, altho' it proceeds from oil, certainly is not oil, but pure phlogiston; since coal added to vitriolic acid can form sulphur, to phosphoric acid can form phosphorus, &c. and since oil can produce none of these effects till it has been decomposed and reduced to the state of coal. Besides, the phenomena accompanying the burning of coal are different from those which happen when oily substances are burnt. The flame of charcoal is not so bright as that of oil, and produces no flame or foot.

All the phlogiston of coal is not burnt in the open air, particularly when the combustion is slow. One part of it exhales without decomposition, and forms a vapour, or an invisible and insensible gas. This vapour (which is, or at least contains a great deal of, fixed air) is found to be very pernicious, and to affect the animal system in such a manner as to occasion death in a very short time. For this reason it is dangerous to remain in a close place, where charcoal or any other sort of coal is burnt. Persons struck by this vapour are stunned, faint, suffer a violent headache, and fall down senseless and motionless. The best method of recovering them is by exposure to the open air, and by making them swallow vinegar, and breathe its steam.

Amongst coals, some differences are observable, which proceed from the difference of the bodies from which they are made: some coals, particularly, are more combustible than others. This combustibility seems to depend on the greater or less quantity of saline principle they contain; that is, the more of the saline principle it contains, the more easily it decomposes and burns. For example, coals made of plants and wood containing much saline matter capable of fixing it, the ashes of which contain much alkaline salt, burn vigorously and produce much heat; whereas the coals of animal matter, the saline principles of which are volatile, and cannot be fixed but in small quantity, and the ashes of which contain little or no salt, are scarcely at all combustible. For they not only do not kindle so easily as charcoal does, nor ever burn alone, but they cannot be reduced to ashes without very great trouble, even when the most effectual methods are used to facilitate the combustion. The coal of bullock's blood has been kept for six hours very red in a shallow crucible, surrounded with burning charcoal, and constantly stirred all the time, that it might be totally exposed to the air; yet could it not be reduced to white, or even grey, ashes: It still remained very black, and full of phlogiston. The coals of pure oils, or of concrete oily substances and foot, which is a kind of coal raised during inflammation, are as difficultly reduced to ashes as animal coals. These coals contain very little saline matter; and their ashes yield no alkali. The coals which are so difficultly burnt, are also less capable of inflaming with nitre than others more combustible: and some of them even in a great measure resist the action of nitre.

COAL, in mineralogy, a kind of solid inflammable substance, supposed to be of a bituminous nature, and commonly used for fuel. Of this substance there are various species.

1. *Pit-coal (Lithanthrax)*, is a black, solid, compact,

Coal.

Coal.

pact, brittle mass, of moderate hardness, lamellated structure, more or less shining, but seldom capable of a good polish; and does not melt when heated. According to Kirwan, it consists of petrol or asphaltum, intimately mixed with a small portion of earth chiefly argillaceous; seldom calcareous; and frequently mixed with pyrites. A red tincture is extracted from it by spirit of wine, but caustic alkali attacks the bituminous part. From some sorts of it a varnish may be made by means of fat oils. Fixed alkali has never been found in any kind of it, nor sulphur, unless when it happens to be mixed with pyrites.—None of the various kinds are found to be electrics *per se* (A)

The varieties of lithanthrax, enumerated by Cronstedt, are, 1. With a small quantity of argillaceous earth and vitriolic acid. It is of a black colour, and shining texture; it burns, and is mostly consumed in the fire, but leaves, however, a small quantity of ashes. 2. Slaty coal.

2. *Culm coal*, called *kolm* by the Swedes, has a greater portion of argillaceous earth and vitriolic acid, with a moderate proportion of petrol. It has the same appearance with the foregoing, though its texture is more dull: it burns with a flame, without being consumed, but leaves behind it a slag of the same bulk with the original volume of the coal. The following is Mr Kirwan's description of it from the memoirs of the Stockholm academy. "Its fracture has a rougher section than the cannel coal; its specific gravity from 1300 to 1370. The best kind affords by distillation, at first fixed air, then an acid liquor, afterwards inflammable air, and a light oil of the nature of petrol; then a volatile alkali; and lastly pitch-oil. The residuum is nearly three quarters of the whole; and being slowly burnt, affords 13 per cent. of ashes, which consist mostly of argillaceous earth; and about three hundredth parts of them are magnetic. It is found in England, and among some aluminous ores in Sweden."

3. *Slate-coal* contains such a quantity of argillaceous earth, that it looks like common slate: however, it burns by itself with a flame. M. Magellan is of opinion that this is the bituminous substance already described (see CLAY, p. 51.) This schistus is of a dark bluish rusty colour; when thrown on the fire it burns with a lively flame, and almost as readily as the oily wood of dry olive tree, or *lignum vitæ*; emitting the very disagreeable smell of petrol. Such large quarries

of it are found near Purbeck in Dorsetshire, that the poorer part of the inhabitants are thence supplied with fuel. From the appearance of this slaty coal, Cronstedt has been induced to suppose that the earth of all kinds of coal is argillaceous, though it is not so easy to distinguish it after being burnt. The pit-coals, he says, contain more or less of the vitriolic acid; for which reason the smoke arising from them attacks silver in the same manner as sulphur does, let the coals be ever so free from marcasite, which, however, is often imbedded or mixed with them.

4. *Cannel coal* (*Ampelites*), is of a dull black colour; breaks easy in all directions; and, if broken transversely, presents a smooth conchoidal surface. It burns with a bright lively flame, but is very apt to fly in pieces in the fire; however it is said to be entirely deprived of this property by immersion in water for some hours previous to its being used. It contains a considerable quantity of petrol in a less condensed state than other coals. Its specific gravity is about 1.270. This kind of coal, being of an uniform hard texture, is easily turned on a lathe, and takes a good polish. Hence it is used for making various toys, which appear almost as well as if made of the finest jet.

5. *Kilkenny coal* is the lightest of any; its specific gravity being only about 1.400. It contains the largest quantity of asphaltum; burns with less smoke and flame, and more intensely, though more slowly, than the cannel-coal. The quantity of earth it contains does not exceed one-twentieth part of its weight; but this kind of coal is frequently mixed with pyrites. It is found in the county of Kilkenny, belonging to the province of Leinster in Ireland. The quality of it as burning without smoke, is proverbially used as an encomium on the county.

6. *Sulphureous coal* consists of the former kinds mixed with a very considerable portion of pyrites; whence it is apt to moulder and break when exposed to the air, after which water will act upon it. It contains yellow spots that look like metal; burns with a sulphureous smell, leaving behind it either slag or sulphureous ashes, or both. Its specific gravity is 1500 or more.

7. *Bovey coal* (*Xylanthrax*), is of a brown or brownish black colour, and of a yellow laminar texture. Its laminæ are frequently flexible when first dug, though they generally harden when exposed to the

Coal.

(A) "The varieties of this coal (says Mr Magellan) are very numerous according to the different substances with which it is mixed; but in regard to their æconomical uses, only two kinds are taken notice of by the British legislature, *viz.* culm and caking coals. The caking coals, in burning, show an incipient fusion, so that their smallest pieces unite in the fire into one mass; by which means the smallest pieces, and even the mere dust of this kind, are almost equally valuable with the largest pieces. The other sort called *culm*, does not fuse or unite in the fiercest fire; so that the small coal being unfit for domestic purposes, can only be used in burning limestone.

"It should be an easy matter for any person to distinguish culm from small caking coal, either by trying to make fire with it in a common grate, without interposing any other fuel between it; when if it kindles, it is a caking coal; if not, it is culm: Or by putting some of these small fragments of coal on an ignited iron shovel; if they melt and run together, they belong to the caking kinds; if not, they are culm. But it seems that coal merchants are now in the custom of calling *culm* the powdery parts of pit-coal, of whatsoever kind they may happen to be. The reason of this is, that there is a difference in the duty payable by culm and by caking coals. There never was any difficulty, however, on the subject; nor would there be any difficulty in collecting the tax, were it not for the insufferable ignorance and love of despotic oppression which generally pervades the underling officers of the revenue."

Coal. the air. It consists of wood penetrated with petrol or bitumen, and frequently contains pyrites, alum, and vitriol. According to the German chemists its ashes contain a little fixed alkali; but Mr Mills differs from them on this subject. By distillation it yields a fetid liquor mixed with a volatile alkali and oil; part of which is soluble in spirit of wine, and part of a mineral nature, and insoluble. It is found in almost all the countries of Europe.

These are the most considerable varieties of coals commonly known; but we must not imagine that each of them is to be met homogeneous in those places where they are found. On the contrary, the different qualities and proportions of their ingredients make a vast number of other varieties, fit for different purposes, according to the quality and quantity of those they contain. Thus, various kinds of coals are often found mixed with one another under ground; and some of the finer sorts sometimes run like veins between those of a coarser kind. Thus, M. Magellan observed in the fine coals employed in a curious manufactory at Birmingham, that they produced a much clearer flame than he had ever observed from common coal; yet, on inquiry, he found that these were picked out from the common coals of the country, through which they ran in veins, and were easily distinguished by the manufacturers, though they did not afford sufficient indications of a specific difference. The purpose to which they were applied was the moulding rods of transparent and coloured glass into the shapes proper for common buttons; which they performed with astonishing expedition.

Fourcroy remarks, that this fossil bitumen, when heated in contact with a body in combustion, and having a free access of air, kindles the more slowly and with the greater difficulty in proportion as it is more weighty and compact. When once kindled, it emits a strong and durable heat, and burns for a long time before it is consumed. The matter that is burned, and produces the flame, appears very dense, and seems united to some other substance which retards its destruction. On burning, it emits a particular strong smell, which is not at all sulphureous when the coal contains no pyrites. When the combustible, oily, and other volatile parts of the coal are dissipated, if the combustion be then stopped, the remainder is found to be reduced to a true charred state, and is called *coak*. This substance is capable of exciting the most intense heat, for which purpose it is used in metallurgic works all over Britain.

"It is well known (says M. Magellan), that the English method of burning pit-coal into *coak* has been a most profitable and happy acquisition for the smelting our ores, and for many other metallurgical and chemical processes in this island. But the ingenious and advantageous undertaking of lord Dundonald, by which he turns to a very considerable profit the mines of coals in his and other estates, building ovens of a proper construction for burning pit-coal into *coak*, and at the same time for collecting, in separate receptacles, the volatile alkali, oil, tar, and pitch, which were generally lost by the usual method, deserves to be noticed, as it affords a very remarkable instance of the great losses to mankind, for want of carefully attending to every result from great processes of art

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when made on a large scale. These ovens are so contrived, as to admit an under supply of air; and the coals, after being kindled, decompose themselves by a slow but incomplete combustion, which does not destroy the ingredients. The residuum left in the oven proves to be most excellent cinders or coaks; whilst the volatile parts, which otherwise would be dissipated in the air, are separated and condensed in reservoirs, or receptacles of capacious size, placed at proper distances beyond the reach of fire. Mons. Faujas de St Fond, who visited these works in a trip he made to Scotland, undertook to erect a similar kind of oven in France: and it is rather singular, that he endeavours to establish a claim of having discovered the same processes before he saw them in Scotland; as if it did not reflect a greater honour on his industry, to carry back to his country some useful knowledge, than to return as ignorant as our English travellers," &c.

On subjecting pit-coal of any kind to distillation in close vessels, it first yields a phlegm or watery liquor; then an ethereal or volatile oil; afterwards a volatile alkali; and lastly, a thick and greasy oil: but it is remarkable, that, by rectifying this last oil, a transparent thin and light oil of a straw colour is produced, which being exposed to the air becomes black like animal oils. From this and other observations, the general opinion is, that all coals, bitumens, and other oily substances found in the mineral kingdom, derive their origin from vegetables buried in the earth; since it is well known that only organised bodies have the power of producing oily and fat substances. "The amazing irregularities, gaps, and breaks (says M. Magellan) of the strata of coals, and of other fossil substances, evince that this globe has undergone the most violent convulsions, by which its parts have been broken, detached and overturned in different ways, burying large tracts of their upper surfaces, with all the animal and vegetable productions there existing, at the time of those horrible catastrophes, whose epoch far precedes all human records. And it is easy to be conceived, that the various heaps and congeries of these vegetable and animal substances, remaining for ages and ages in the bowels of the earth, have obtained various consistencies, and still produce those oily and bituminous juices, which find way to gush out, leaving behind their thickest parts on the same places where they are found, and in many others where the industry of mankind never will be able to penetrate."

Coal-Mine. See **COALERY**.—Maliciously setting fire to coal-mines is felony, by stat. 10. Geo. II. c. 32. § 6.

Small Coal, a sort of charcoal prepared from the spray and brushwood stripped off from the branches of coppice wood, sometimes bound in bairns for that purpose, and sometimes charred without binding, in which case it is called "coming it together."

COALERY, COALIERV, or COLLIERY; a coal. History of work, or place where **COALS** are dug. coals.

It is generally agreed, that our cannel-coal * is the * See *lapid. ampetites* of the Romans; though it seems to *pelites*. have been used by them only for making toys, bracelets, &c. But of that common fuel which we denominate *coals*, the native Romans were entirely ignorant. It is certain that they are not, as some have imagined, the *lapis obsidianus* of Pliny, about which there have

M

been

Coal,
Coalery.

Coalery.
† L. xxxvi.
cap. 26.
Augustus
placed the
statues of
four ele-
phants
made of it
in the tem-
ple of Con-
cord.

Whitaker's
History of
Manchester.

i.e. "the
place of
tents." An
ancient Bri-
tish town,
the site of
which was
the present
Castlefield
at Manches-
ter.

been great disputes: nor the GAGATES, or JET, which others, again, have taken for the *lapis obsidianus*; though the lightness and texture show plainly that it is not either stone or coal. In fact, there are no beds of it in the compass of Italy. The great line of that fuel seems to sweep away round the globe, from north-east to south-west; not ranging at a distance even from the south-easterly parts of our island, as is generally imagined, but actually visiting Brabant and France, and yet avoiding Italy.

But the primæval Britons appear to have used it. And in the precincts of Manchester particularly, which are furnished with an inexhaustible abundance of it, they could not have remained unapprised of the argeeable combustible around them. The currents there frequently bring down fragments of coal from the mountains; and in the long and winding course of them through the parish, the Britons would soon mark the shining stones in the channels; and by the aid of accident, or the force of reflection, find out the utility of them. But we can advance still nearer to a certainty. Several pieces of coal were discovered some years ago in the sand under the Roman way to Ribchester, when both were dug up at the construction of a house in Quay-street. The number of pieces, several of them as large as eggs, was not less than 40; and a quantity of slack was dug up with them. These circumstances show the coals to have been lodged upon the spot, before the road of the Romans covered it. That ground being in the neighbourhood of *Mance-*
nion†, the Britons had there repositied a quantity of coals, probably for the use of the garrison; and many of the smaller fragments, and some of the slack, were buried in the sand upon which they were laid. And that the Britons in general were acquainted with this fuel, is evident from its appellation amongst us at present, which is not Saxon, but British; and subsists among the Irish in their *O gual*, and among the Cornish in their *kolan*, to this day.

The extensive beds of fuel, therefore, with which the kingdom of England and the precincts of Manchester are so happily stored, were first noticed by the skill, and first opened by the labour, of the Britons; and some time before the arrival of the Romans among us. And the nearer quarries in the confines of Bradford, Newton, and Manchester, would naturally attract the notice, and invite the inquiries, of the Britons, before any others. The current of the Medlock, which washes the sides of them, would bring down specimens of the riches within, lodge many of them about the Castlefield, and allure the Britons successively to a collection of the one and a search after the other.

But, even for ages after the discovery, wood continued to compose the general firing of the nation. In 852, a grant was made of some lands by the abbey of Peterborough, under the reservation of certain boons and payments in kind to the monastery; as, one night's entertainment; 10 vessels of Welsh and two of common ale; 60 cart-loads of wood; and 12 of pit-coal; where we see the quantity of coal was only one cart-load to five of wood. The latter naturally continued the principle article of our fuel as long as the forests and thickets presented themselves so ready to the hand: and such it continued till a very late period. The first public notice of the former is mentioned by

Mr Hume to have been in the time of Henry III. who in the year 1272, granted a charter to the town of Newcastle, giving the inhabitants a licence to dig coals: and the first statute relating to this article was the 9 Henry V. c. 10. ordaining all keels in the port of Newcastle to be measured by commissioners, before carriage of coals, on pain of forfeiture. They were not brought into common use till the reign of Charles I.; and were then sold for about 17 s. a chaldron. In some years after the restoration, there were about 200,000 chaldrons burnt in London; in 1670, about 270,000 chaldrons; and at the revolution, upwards of 300,000 chaldrons; and at present, full 600,000 are annually consumed there. There is, besides, an immense consumption in other parts of Britain, and in Ireland. In Scotland, they supply their own consumption, and also export. In Ireland, though they have coal, yet they take annually to the value of 30,000l. from England, and 12,000l. from Scotland.

The most remarkable coalery, or coal-work, that we have ever had in this island, was that wrought at Burrowstounness, under the sea. The veins of coal were found to continue under the bed of the sea in this place, and the colliers had the courage to work the vein near half way over; there being a mote half a mile from the shore, where there was an entry that went down into the coal-pit, under the sea. This was made into a kind of round key or mote, as they call it, built so as to keep out the sea, which flowed there twelve feet. Here the coals were laid, and a ship, of that draught of water, could lay her side to the mote, and take in the coal.—This famous colliery belonged to the earl of Kincardine's family. The fresh water which sprung from the bottom and sides of the coal pit, was always drawn out upon the shore by an engine moved by water, that drew it forty fathom. This coal-pit continued to be wrought many years to the great profit of the owners, and the wonder of all that saw it; but, at last, an unexpected high tide drowned the whole at once: the labourers had not time to escape, but perished in it.

There are several other countries in Europe which possess considerable coal-mines; as France, Liege, Germany, and Sweden. Also on the other side of the Atlantic ocean, there has been coal discovered, and wrought; in Newfoundland, Cape-Breton, Canada, and some of the New-England provinces. But in all these countries, the coal is of a quality much inferior to the British, and entirely unfit to be used in many manufactures; so that they are obliged to import great quantities from Britain for the use of their manufactures of iron, &c.

Our inland coal-trade, that is, carrying coals from Newcastle, Sunderland, Blith, and other adjacent places in the north of England, as also from the frith of Edinburgh in Scotland, and other places thereabouts, to the city of London, and to the port-towns on the coast all the way, as well on this side of Newcastle, north, as up the channel as high as Portsmouth west, is a prodigious article, and employs abundance of shipping and seamen; in so much that, in a time of urgent necessity, the coalery navigation alone has been able to supply the government with a body of seamen for the royal navy, able to man a considerable fleet at a very short warning, and that without difficulty, when

Coalery.
Campbell's
Political
Survey.

Excellence
of the Bri-
tish coals.

Importance
of the coal-
trade.

Coalery. no other branch of trade would do the like. Likewise the Whitehaven coaleries in Cumberland, belonging to Sir James Lowther, furnish several counties in Ireland with coals, and constantly employ upwards of 2000 seamen; which also is a noble nursery for the navy of this kingdom. And not only do the pit-coals sufficiently supply all the ports, but, by means of those ports and the navigable rivers, all the adjacent counties very far inland

In short, coals, though not an exclusive, yet may, with propriety, be styled a peculiar blessing to Britain from their great plenty, their acknowledged excellence, and their being found in such places as are conveniently situated for exportation. Nor is there any danger of the export-trade being lessened even by the several duties that have been laid upon them; for the foreign consumpt being founded in necessity with regard to manufactures, and in œconomy where they are used for convenience (wood and turf being dearer than coals with the duty), we need be in no fear of the markets declining. There is as little room to be alarmed from an apprehension of their being exhausted, as the present works are capable of supplying us for a long series of years, and there are many other mines ready to be opened when these shall fail. Besides, there are known to be coals in many parts of the three kingdoms, which hitherto they have had no encouragement to work.

Besides the value of this commodity as a convenience of life, as an article of commerce, and as giving rise to a nursery of seamen for the increase of the marine; other important advantages deserve to be noticed. Coals are in many respects, and in a very high degree, useful to the landed interest; not only by raising exceedingly the real value, and of course the purchase, of those lands in which they are found, and those

* These are emphatical-ly styled *way-leaves*, and are let at as high rents as any landed property in Britain. through which it is necessary to pass* from the works to the places where they are embarked, but from the general improvements they have occasioned; so that very few counties are now better cultivated than Northumberland, and the same effects they have had in a greater or less degree in other places. Thousands of laborious people are employed in and about the mines; thousands more in conveying them to the ports, and on board the ships; to say nothing of those that draw their subsistence from the carriage of them by land to supply families, &c. There are also great numbers that live in a superior station; as stewards, directors, factors, agents, book-keepers, &c. To these we may add the extraordinary encouragement given to ingenious artists who have invented, and the numerous workmen continually employed about those several curious and costly machines which, for a variety of purposes in this business, are in continual use, and of course in continual wear: we may join to these the multitudes that obtain their living from the many manufactures in which they are employed, and which could not be carried on but by the help and cheapness of coals. Lastly, the produce of coals exported, which amounts to a very considerable sum, besides being profitable to the owners, merchants, and mariners, is so much clear gain to the nation.

It might be expected, that a trade so beneficial to individuals, and to the nation in general, and which has been gradually increasing for several centuries past,

would have been advanced by this time to very great perfection, and reduced to a regular system. But, in one very essential respect, it is found to be quite otherwise. The art of working coal-mines in the most profitable manner is indeed highly improved: but the fundamental of the art, that of searching for and discovering coal in any district of country where it has not yet been found, has never, that we know of, been treated in a systematic manner. The reader, therefore will not be displeased to find this defect supplied in the course of the present article, together with a detail of all the other operations in the business of coaleries.

The terrestrial matters which compose the solid parts of the earth are disposed in strata, beds, or layers, the under surface of one bearing against or lying upon the upper surface of that below it, which last bears or lies on the next below in the same manner. ⁴ Situation of the strata.

These strata consist of very different kinds of matter, such as free stone, lime-stone, metal-stone or whinstone, coal, &c. as will be particularly specified in the sequel.

Some of these strata are of a considerable thickness, being often found from 100 to 200 feet or upwards, nearly of the same kind of matter from the superior to the inferior surface; and others are found of the least thickness imaginable, one inch or less.

All these strata are divided or parted from each other laterally, either by their even, smooth, polished surfaces, with very thin lamina of soft or dusty matter betwixt them, called *the parting*, which renders them easy to separate; or else only by the surfaces closely conjoined to each other, without any visible matter interposed betwixt them; yet the different substance of each stratum is not in the least intermixed, though sometimes they adhere so strongly together, that it is very difficult to part or disjoin them: in this last case they are said to have a *bad parting*.

Besides this principal division or parting laterally, there are, in some strata, secondary divisions or partings also laterally, separating or approaching towards a separation, of the same strata, into parts, of different thicknesses, nearly parallel to each other, in the same manner as the principal partings divide the different strata from each other: but these secondary ones are not so strong or visible, nor make so effectual a parting, as the principal ones do; and are only met with in such strata, as are not of an uniform hardness, texture, or colour, from the upper to the under surface.

There are other divisions or partings, called *backs*, in almost every stratum, which cross the former lateral ones longitudinally, and cut the whole stratum through its two surfaces into long rhomboidal figures. These again are crossed by others called *cutters*, running either in an oblique or perpendicular direction to the last mentioned backs, and also cut the stratum through its two surfaces. Both these backs and cutters generally extend from the upper or superior stratum down through several of the lower ones; so that these backs and cutters, together with the lateral partings before mentioned, divide every stratum into innumerable cubic, prismatic, and rhomboidal figures, according to the thickness of the stratum, and the position and number of the backs and cutters. They

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sometimes have a kind of thin partition of dusty or soft matter in them, and sometimes none, like the first mentioned partings; but the softer kind of strata generally have more backs and cutters than the harder kind, and they do not extend or penetrate through the others.

Plate
CXLII.

To explain this a little further, let A, B, C, D, E, F, G, (fig. 1.) represent the principal partings before mentioned, or the upper and under surfaces of any stratum; then a, b, c, d, e, f. will represent the secondary lateral partings nearly parallel to the principal ones: g, h, i, k, l, m, the longitudinal partings called *backs*; n, o, p, q, r, s, the cross partings called *cutters*, crossing the last mentioned ones either obliquely or perpendicular.

In all places where the strata lie regular, they are divided and subdivided in the manner above mentioned; and sometimes in this manner extend through a pretty large district of country: though it is often otherwise; for their regularity is frequently interrupted, and the strata broken and disordered, by sundry chasms, breaches, or fissures, which are differently denominated according to their various dimensions, and the matters with which they are filled, viz. dikes, hitches, and troubles, which shall be explained in order.

3
Dikes.

Dikes, are the largest kind of fissures. They seem to be nothing but a crack or breach of the solid strata, occasioned by one part of them being broken away and fallen from the other. They generally run in a straight line for a considerable length, and penetrate from the surface to the greatest depth ever yet tried, in a direction sometimes perpendicular to the horizon, and sometimes obliquely: the same kind of strata are found lying upon each other in the same order, but the whole of them greatly elevated or depressed, on the one side of the dike as on the other. These fissures are sometimes two or three feet wide, and sometimes many fathoms. If the fissure or dike be of any considerable width, it is generally filled with heterogeneous matter, different from that of the solid strata on each side of it. It is sometimes found filled with clay, gravel, or sand; sometimes with a confused mass of different kinds of stone lying edgewise; and at other times with a solid body of free-stone, or even whin-stone. When the fissure is of no great width, as suppose two or three feet only, it is then usually found filled with a confused mixture of the different matters which compose the adjoining strata, consolidated into one mass. If the dike runs or stretches north and south, and the same kind of strata are found on the east side of the dike, in a situation with respect to the horizon 10 or 20 fathoms lower than on the other side, it is then said to be a *dip-dike*, or *downcast-dike* of 10 or 20 fathoms to the eastward;—or counting from the east side, it is then said to be a *rise-dike* or *upcast* of so many fathoms westward. If the strata on one side are not much higher or lower with respect to the horizontal line, than those on the other, but only broken off and removed to a certain distance, it is then said to be a dike of so many fathoms thick; and from the matter contained between the two sides of the fissure or dike, it is denominated a *clay-dike*, *stone-dike*, &c.

8
Hitches.

A *hitch* is only a dike or fissure of a smaller degree, by which the strata on one side are not elevated or separated from those on the other side above one fa-

thom. These hitches are denominated in the same manner as dikes, according to the number of feet they elevate or depress the strata.

There are dikes (though they are not often met with in the coal-countries) whose cavities are filled with sparr, the ores of iron, lead, vitriol or other metallic or mineral matters; and it is pretty well known, that all metallic veins are nothing else than what in the coal-countries are called *dikes*.

The strata are generally found lying upon each other in the same order on one side of the dike as on the other, as mentioned above, and nearly of the same thicknesses, appearing to have been originally a continuation of the same regular strata, and the dike only a breach by some later accident, perpendicularly or obliquely down through them, by which one part is removed to a small distance, and depressed to a lower situation than the other. But this is not the only alteration made in the strata by dikes; for generally to a considerable distance on each side of the dike, all the strata are in a kind of shattered condition, very tender, easily pervious to water, and debased greatly in their quality, and their inclination to the horizon often altered.

Troubles may be denominated dikes of the smallest degree; for they are not a real breach, but only an approach towards it which has not taken a full effect. The strata are generally altered by a trouble from their regular site to a different position. When the regular course of the strata is nearly level, a trouble will cause a sudden and considerable ascent or descent; where they have, in their regular situation, a certain degree of ascent or descent, a trouble either increaseth it or alters it to a contrary position: and a trouble has these effects upon the strata in common with dikes; that it greatly debaseth them from their original quality; the partings are separated; the backs and cutters disjoined, and their regularity disordered; the original cubic and prismatic figures, of which the strata were composed, are broken, and the dislocation filled with heterogeneous matter; and the whole strata are reduced to a softer and more friable state.

The strata are seldom or never found to lie in a true horizontal situation; but generally have an inclination or descent, called the *dip*, to some particular part of the horizon. If this inclination be to the east-ward, it is called an *east dip*, and a *west rise*; and according to the point of the compass to which the dip inclines, it is denominated, and the ascent or rise is to the contrary point. This inclination or dip of the strata is found to hold every where. In some places, it varies very little from the level; in others, very considerably; and in some so much, as to be nearly in a perpendicular direction: but whatever degree of inclination the strata have to the horizon if not interrupted by dikes, hitches, or troubles, they are always found to lie in the first regular manner mentioned. They generally continue upon one uniform dip until they are broken or disordered by a dike, hitch, or trouble, by which the dip is often altered, sometimes to a different part of the horizon, and often to an opposite point; so that on one side of a dike, hitch, or trouble, if the strata have an east dip, on the other side they may have an east rise, which is a west dip; and in general, any considerable alteration in the dip is never met

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Coalery. met with, but what is occasioned by the circumstances left mentioned.

Plate To illustrate what has been said, see fig. 2. where
CXLII. *a b c d*, &c. represents a course of strata lying upon each other, having a certain inclination to the horizon. *A B* is a downcast dike, which depresseth the strata obliquely to *e f g h*, &c. lying upon each other in the same order, but altered in their inclination to the horizon. *C D* represents a clay or free-stone dike, where the strata are neither elevated nor depressed, but only broken off and removed to a certain distance. *E F*, represents a hitch, which breaks off and depresseth the strata only a little, but alters their inclination to the horizon. *G H*, represents a trouble, where the strata on one side are not entirely broken off from those on the other, but only in a crushed and irregular situation.

As some particular strata are found at some times to increase, and at other times to diminish, in their thicknesses, whilst others remain the same, consequently they cannot be all parallel; yet this increase and diminution in their thicknesses comes on very gradually.

The strata are not found disposed in the earth according to their specific gravities: for we often find strata of very dense matter near the surface; and perhaps at 50 or even 100 fathoms beneath, we meet with strata of not half the specific gravity of the first. A stratum of iron ore is very often found above one of coal, though the former has twice the gravity of the latter; and, in short, there is such an absolute uncertainty in forming any judgment of the disposition of the strata from their specific gravities, that it cannot in the least be relied upon.

It has been imagined by many, that hills and valleys are occasioned by those breaches in the strata before mentioned called *dikes*: but this is contradicted by experience. If it was so, we should meet with dikes at the skirts of the hills, and by the sides of valleys, and the sea-shore; but instead of that, we generally find the strata lying as uniformly regular under hills and valleys, and beneath the bottom of the sea (as far as has been yet tried), as in the most campaign countries. It may happen, indeed, that a dike is met with in some of these places; but that being only a casual circumstance, can never be admitted as a general cause. Whatever irregularities are occasioned in the solid strata by dikes, or other breaches, are commonly covered over and evened by those beds of gravel, clay, sand, or soil, which lie uppermost, and form the outward surface of the earth. Wherever these softer matters have been carried off, or removed by accident, as on the tops of hills and the sides of valleys, there the solid strata are exposed, and the dip and rise and other circumstances of them may be examined; but no certain conclusions can be drawn, merely from the unevenness and inequalities of the outward surface.

The preceding observations, upon the general disposition of the solid strata, are equally applicable to the strata of coal as to those of stone or other matter.

9. Description of the strata connected with coal. We shall next give an account of the several strata of coal, and of stone and other matters, which are usually connected with coal, and are found to have a particular affinity with it: and, for the sake of distinction, shall arrange them into six principal classes,

which will include all the varieties of strata that have been found to occur in all those districts of country both in Scotland and England where coal abounds.

1. *Of Whin-stone.*] The strata of what is denominated whin-stone are the hardest of all others; the angular pieces of it will cut glass; it is of a very coarse texture, and when broke across the grain exhibits the appearance of large grains of sand half vitrified; it can scarcely be wrought, or broke in pieces, by common tools without the assistance of gun-powder; each stratum is commonly homogeneous in substance and colour, and cracked in the rock to a great depth. The most common colours of these strata are black or dark blue, yet there are others of it ash-coloured and light brown. Their thickness in all the coal countries is but inconsiderable, from six or five feet down to a few inches; and it is only in a few places they are met with of these thicknesses. In the air it decays a little, leaving a brown powder; and in the fire it cracks, and turns reddish brown. Limestone, and what is called *bastard limestone*, is sometimes, though rarely, met with in coaleries. It is a well known stone; but from its resemblance in hardness and colour is often mistaken for a kind of whin. Sometimes, particularly in hilly countries, the solid matter next the surface is found to be a kind of soft or rotten whin;—but it may be noted, that this is only a mass of heterogeneous matter disposed upon the regular strata; and that beneath this, all the strata are generally found in as regular an order as where this heterogeneous matter does not occur.

2. *Of Post-stone.*] This is a free stone of the hardest kind, and next to the limestone with respect to hardness and solidity. It is of a very fine texture; and when broken appears as if composed of the finest sand. It is commonly found in a homogeneous mass, though variegated in colour; and, from its hardness, is not liable to injury from being exposed to the weather. Of this kind of stone there are four varieties, which may be distinguished by their colour: the most common is white post, which in appearance is like Portland stone, but considerably harder; it is sometimes variegated with streaks or spots of brown, red, or black.

Grey post is also very common; it appears like a mixture of fine black and white sand: it is often variegated with brown and black streaks; the last mentioned appear like small clouds composed of particles of coal.

Brown or yellow post is often met with of different degrees of colour; most commonly of the colour of light ochre or yellow sand: it is as hard as the rest, and sometimes variegated with white and black streaks.

Red post is generally of a dull red colour: this is but rarely met with; it is often streaked with white or black.

All these lie in strata of different thicknesses; but commonly thicker than any other strata whatever: they are separated from each other, and from other kinds of strata, by partings of coal, sand, or soft matter of different colours which are very distinguishable.

3. *Of Sand-stone.*] This is a free stone of a coarser texture than post, and not so hard; is so lax as to be easily pervious to water; when broke, is apparently of a coarse sandy substance; is friable and moulders to sand.

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sand when exposed to the wind and rain; has frequently white shining spangles in it, and pebbles or other small stones inclosed in its mass. Of this, there are two kinds commonly met with, distinguished by their colours, grey and brown, which are of different shades, lighter or darker in proportion to the mixture of white in them. It is most generally found in strata of considerable thickness, without many secondary partings: and sometimes, though rarely, it is subdivided into layers as thin as the common grey slate. It has generally sandy or soft partings.

4. *Of Metal-stone.*] This is a tolerable hard stratum, being in point of hardness next to sand-stone: generally solid, compact, of considerable weight, and of an argillaceous substance, containing many nodules or balls of iron ore, and yellow or white pyrites; its partings, or the surfaces of its strata, are hard, polished, and smooth as glass. When broke, it has a dull dusky appearance (though of a fine texture), like hard dried clay mixed with particles of coal. Though hard in the mine or quarry, when exposed to the fresh air it falls into very small pieces. The most usual colour of this stone is black; but there are several other lighter colours, down to a light brown or grey. It is easily distinguished from free-stone by its texture and colour, as well as by its other characteristics. It lies in strata of various thicknesses, though seldom so thick as the two last mentioned kinds of stone.

5. *Of Shiver.*] This stratum is more frequently met with in coaleries than any other. There are many varieties of it, both in hardness and colour; but they all agree in one general characteristic. The black colour is most common; it is called by the miners *black shiver*, *black mettle*, or *bleas*. It is softer than metal-stone, and in the mine is rather a tough than a hard substance, is not of a solid or compact matter, being easily separable, by the multitude of its partings, &c. into very small parts, and readily absorbing water. The substance of this stratum is an indurated bole, commonly divided into thin lamina of unequal thicknesses, which break into long small pieces when struck with force; and, on examination, they appear to be small irregular rhomboides: each of these small pieces has a polished glassy surface; and, when broke cross the grain, appears of a dry, leafy, or laminated texture, like exceeding fine clay: it is very friable; feels to the touch like an unctuous substance; and dissolves in air or water to a fine pinguid black clay. There are almost constantly found inclosed in its strata lumps or nodules of iron ore; often real beds of the same.

There are other colours of this stratum besides black. The brown or dun shiver is very frequently met with; it agrees with the above description in every thing but colour. Grey shiver is also very common: it seems to be only a mixture of the black and dun; and by the different degrees of mixture of these colours others are produced. It lies in strata sometimes of considerable thickness, at other times not exceeding a few feet: they are commonly parted from each other by lamina or spar, coal, or soft matter.

6. *Of Coal.*] Referring the reader, for the scientific division of coals, to AMPELITES, LITHANTHRAX, and the preceding articles, we shall here consider them as

distinguishable into three kinds, according to their degrees of inflammability. Coalery.

1. The least inflammable kinds are those known by the name of *Welsh coal*, which is found in Wales; *Kilkenny coal*, which is found near Kilkenny in Ireland; and *blind or deaf coal*, which is found in many parts of Scotland and England. This coal takes a considerable degree of heat to kindle it, but when once thoroughly ignited will burn a long time; it remains in the fire in separate pieces without sticking together or caking; it produceth neither flame nor smoke, and makes no cinder, but burns to a white stony slag; it makes a hot glowing fire like charcoal or cinders; and emits effluvia of a suffocating nature which renders it unfit for burning in dwelling-houses, its chief use being amongst maltsters, dyers, &c. for drying their commodities. 2. *Open burning coal*, soon kindles, making a hot pleasant fire, but is soon consumed: it produceth both smoke and flame in abundance; but lies open in the fire, and does not cake together so as to form cinders, its surface being burnt to ashes before it is thoroughly calcined in the midst; from this it has its name of an *open burning coal*: it burns to white or brown ashes very light. Of this kind is cannel-coal, jett, parrot, splint, and most of the coals in Scotland. 3. *Close burning coal*, kindles very quickly, makes a very hot fire, melts and runs together like bitumen, the very smallest culm making the finest cinders, which being thoroughly burnt are porous and light as a pumice stone, and when broke are of a shining lead colour; it makes a more durable fire than any other coal, and finally burns to brown or reddish coloured heavy ashes. Of this kind are the Newcastle and several other of the English coals, and the smithy coals of Scotland. The open burning and the close burning coal mixed together, make a more profitable fire for domestic uses than either of them separate.

In all those districts of country where coal is found, there are generally several strata of it; perhaps all the different kinds above mentioned will be found in some, and only one of the kinds in others; yet this one kind may be divided into many different seams or strata, by beds of shiver or other kinds of matter interposing, so as to give it the appearance of so many separate strata.

All these strata above described, with their several varieties, do not lie or bear upon each other in the order in which they are described, nor in any certain or invariable order. Though there be found the same kinds of strata in one coalery or district as in another, yet they may be of very different thicknesses. In some places there are most of the hard kinds, in others most of the softer: and in any one district it rarely happens that all the various kinds are found; for some kinds, perhaps, occur only once or twice, whilst others occur 10 or 20 times before we reach the principal stratum of coal.

In order to explain this, suppose the strata in the pit at A (fig. 3.) lie in the order *a, b, c, d, &c.* they may be so much altered in their thicknesses, by reason of some of them increasing and others diminishing, at the distance of B, that they may be found there of very different thicknesses; or if they are examined in a pit at D, by reason of its lower situation, and the

strata

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The order
in which
they lie.

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Coalery. strata there not being a continuation of those in the other places, they may be very different both in their order and thicknesses, and yet of the same kinds.

Though they be thus found very different in one coalery or district from what they are found to be in another, with respect to their thicknesses, and the order in which they lie upon each other, yet we never meet with a stratum of any kind of matter but what belongs to some of those above described.

To illustrate how the various strata lie in some places, and how often the same stratum may occur betwixt the surface and the coal, we shall give the following example. The numbers in the left hand column refer to the classes of strata before described, to which each belongs. The second column contains the names of the strata; and the four numeral columns to the right hand, express the thickness of each stratum, in fathoms, yards, feet and inches.

N ^o	EXAMPLE.	Fas	Yds	Ft	Ins.
	Soil and gravel	0	1	1	0
	Clay mixed with loose stones	1	1	0	0
3	Coarse brown sandy-stone, with soft partings	3	0	2	6
2	White post, with shivery partings	1	1	0	5
5	Black shiver or bleas, with iron-stone balls	2	0	2	0
6	Coarse splinty coal	0	0	2	6
5	Soft grey shiver	0	1	0	7
2	Brown and grey post, streaked with black	1	0	2	0
5	Black shiver, with beds and balls of iron-stone	0	1	2	6
4	Grey and black mettle-stone	0	1	1	9
2	White and brown post	1	1	0	0
5	Black and grey shiver, streaked with white	0	1	0	6
3	Soft grey sandy-stone, with shivery partings	0	1	1	0
2	Yellow and white post, with sandy partings	1	0	2	0
5	Black and dun shivery, with iron-stone balls	0	1	2	6
2	White post streaked with black, and black partings	1	0	0	6
5	Grey shiver, with iron-stone balls	0	1	0	9
4	Brown and black metal-stone	1	1	2	6
5	Hard flaty black shiver	1	1	0	0
6	Coal, hard, and fine splint	0	0	3	6
5	Soft black shiver	0	0	0	3
6	Coal, fine and clear	0	0	3	3
5	Hard black shiver	0	0	1	0
Total Fathoms		25	0	0	0

In this instance the species of sand-stone only occurs twice, post five times, whilst the shiver occurs no less than nine times:

To apply the foregoing observations to practice.

Suppose it was required to examine whether there was coal in a piece of ground adjoining to, or in the neighbourhood of, other coaleries.

Methods of searching for coal.
Rule first. In the first place, it is proper to be informed, at some of the adjacent coaleries, of the number and kinds of strata; the order in which they lie upon each other; to what point of the horizon, and in what quantity, they dip; if any dikes, hitches, or troubles, and the course they stretch. Having learnt these circumstances, search in the ground under examination where the strata are exposed to view, and compare these with the other. If they be of the same kinds, and nearly correspond in order and thickness, and be lying in a regular manner, and agree by computation with the dip and rise, it may safely be concluded the coal is there; and the depth of it may be judged from the depth of the coal in the other coalery, below any particular stratum which is visible in this.

If the solid strata are not exposed to view, neither in the hills nor valleys of the ground under examination, then search in the adjoining grounds; and if the same kind of strata are found there as in the adjacent coalery, and there is reason, from the dip and other circumstances, to believe that they stretch through the ground to be examined; it may then be concluded that the coal is there, as well as these other strata.

Suppose a coalery is on the side of a hill at A, fig. 3. and you would search for a coal at B, on the other side of the hill, but in a much lower situation; by observing the several strata lying above the coal at A, and the point to which they dip, which is directly towards B (if clear of dikes), you may expect to find the same kind of strata on the other side of the hill, but much lower down. Accordingly, if some of the strata are visible in the face of the precipice C, they may be compared with some of those in the pit at A. Or, if they are not to be seen there, by searching in the opposite hill, they may perhaps be discovered at the place F; where, if they be found in the manner before mentioned, and there be reason to believe they extend regularly from the first place to this, it is more than probable the coal, as well as these strata, will be found in the intermediate ground.

If the ground to be examined lie more to the rise of the coal, as at E, which being supposed to be on a flat, perhaps the solid strata there may be wholly covered by the gravel, clay, &c. of the outward surface lying upon them: In this case, by measuring the horizontal distance and the descent of ground from A to E, and computing the quantity of ascent or rise of the coal in that distance: by comparing these together, it may be judged at what depth the coal will be found there, allowing that it lie regular. Thus, suppose the coal at A 80 yards deep, the distance from A to E 500 yards, and that the coal rises 1 yard in 10 yards of horizontal distance:

Then, from the depth of the pit 80
Deduct the descent of ground from A to E, suppose 24

This remainder would be the depth, if the coal was level 56
But as the coal rises 1 in 10 feet, then deduct what it rises in 500 yards, which is 50

And the remainder is the depth of that coal at E 6 Yards.

Or suppose that the place at B is 500 yards the contrary way, or to the full dip of the coal at A; if a view of the solid strata cannot be obtained, then by proceeding in the same manner as before, the depth of the coal at that place may be computed. Thus,

To the depth of the coal at the pit A 80
Add the descent or inclination of the coal in 500 yards, which, as before, is 50

This sum would be the depth, if the ground was level 130
But as the ground descends towards B, deduct the quantity of that, which suppose 80

Remains the depth of the coal at B 50 Yards.

Coalery.
Rule 2d.

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Rule 4th.

Coalery.

If the place to be examined be neither to the full dip nor full rise, but in some proportions towards either, the same method may be pursued, computing how much the coal rises or dips in a certain distance in that direction.

If there is known to be a dike in the workings of the pit at A, which elevates or depresseth the strata towards the place under examination, then the quantity of the elevation or depression must be accordingly added to or deducted from the computed depth of the coal at that place. Suppose there is an upcast dike of 10 fathoms or 20 yards towards B, then deduct 20 from 50, the depth before computed, there will remain 30 yards or 15 fathoms for the depth of the coal at B.

But it often happens that coal is to be searched for, in a part of the country, at such a considerable distance from all other coaleries, that by reason of the intervention of hills, valleys, unknown dikes, &c. the connection or relation of the strata with those of any other coalery cannot be traced by the methods last mentioned; in which case a more extensive view must be taken of all circumstances than was necessary in the former; and a few general rules founded on the foregoing observations, and on conclusions drawn from them, will greatly assist in determining sometimes with a great degree of probability, and sometimes with absolute certainty, whether coal be in any particular district of country or not.

Rule 5th.

The first proper step to be taken in such a case is to take a general view of that district of country intended to be searched, in order to judge, from the outward appearance or face of the country, which particular part out of the whole is the most likely to contain those kinds of strata favourable to the production of coal; and consequently such particular part being found, is the most advisable to be begun with in the examination.

Mountainous situations.

Though the appearance of the outward surface gives no certain or infallible rule to judge of the kinds of strata lying beneath, yet it gives a probable one; for it is generally found, that a chain of mountains or hills rising to a great height, and very steep on the sides, are commonly composed of strata much harder and of different kinds from those before described wherein coal is found to lie, and therefore unfavourable to the production of coal; and these mountainous situations are also more subject to dikes and troubles than the lower grounds: so that if the solid strata composing them gave even favourable symptoms of coal, yet the last circumstance would render the quality bad, and the quantity precarious. And, on the whole, it may be observed, that mountainous situations are found more favourable to the production of metals than of coal. It is likewise generally found that those districts abounding with valleys, moderately rising hills, and interspersed with plains, sometimes of considerable extent, do more commonly contain coal, and those kinds of strata favourable to its production, than either the mountainous or champaign countries; and a country so situated as this last described, especially if at some considerable distance from the mountains, ought to be the first part appointed for particular examination. Plains, or level grounds of great extent, generally situated by the sides of rivers, or betwixt

Hills and valleys.

Plains.

such moderate rising grounds as last described, are also very favourable to the production of coal, if the solid strata, and other circumstances in the higher grounds adjoining, be conformable; for it will scarcely be found, in such a situation, that the strata are favourable in the rising grounds, on both sides of the plain, and not so in the space betwixt them. Though plains be so favourable in such circumstances to the production of coal, yet it is often more difficult to be discovered in such a situation, than in that before described; because the clay, soil, and other lax matter, brought off the higher grounds by rains and other accidents, have generally covered the surfaces of such plains to a considerable depth, which prevents the exploration of the solid strata there, unless they be exposed to view by digging, quarrying, or some such operation.

That part of the district being fixed upon which abounds with moderate hills and valleys as properest to begin the examination at, the first step to be taken is to examine all places where the solid strata are exposed to view (which are called the *crops* of the strata), as in precipices, hollows, &c. tracing them as accurately and gradually as the circumstances will allow, from the uppermost stratum or highest part of the ground to the very undermost: and if they appear to be of the kinds before described, it will be proper to note in a memorandum-book their different thicknesses; the order in which they lie upon each other; the point of the horizon to which they dip or incline, and the quantity of that inclination; and whether they lie in a regular state. This should be done in every part of the ground where they can be seen: observing at the same time, that if a stratum can be found in one place, which have a connection with some other in a second place, and if this other has a connection with another in a third place, &c.; then, from these separate connections, the joint correspondence of the whole may be traced, and the strata, which in some places are covered, may be known by their correspondence with those which are exposed to view.

If by this means the crops of all the strata cannot be seen (which is often the case), and if no coal be discovered by its crop appearing at the surface; yet if the strata that have been viewed consist of those kinds before described, and are found lying in a regular order, it is sufficiently probable that coal may be in that part of the district, although it be concealed from sight by the surface of earth or other matter. Therefore, at the same time that the crops of the strata are under examination, it will be proper to take notice of all such springs of water as seem to be of a mineral nature, particularly those known by the name of iron water, which bear a mud or sediment of the colour of rust of iron, having a strong astringent taste. Springs of this kind proceed originally from those strata which contain beds or balls of iron-ore; but by reason of the tenacity of the matter of those strata, the water only disengages itself slowly from them, descending into some more porous or open stratum below, where, gathering in a body, it runs out to the surface in small streams or rills. The stratum of coal is the most general reservoir of this water; for the iron-stone being lodged in different kinds of shiver, and the coal com-

Rule 6th.

monly

Coalery. mostly connected with some of them, it therefore descends into the coal, where it finds a ready passage through the open backs and cutters. Sometimes, indeed, it finds some other stratum than coal to collect and transmit it to the surface; but the difference is easily distinguishable; for the ochrey matter in the water, when it comes from a stratum of coal, is of a darker rusty colour than when it proceeds from any other, and often brings with it particles and small pieces of coal; therefore, wherever these two circumstances concur in a number of these kind of springs, situated in a direction from each other answerable to the stretch or to the inclination of the strata, it may be certain the water comes off coal, and that the coal lies in a somewhat higher situation than the apertures of the springs.

There are other springs also which come off coal, and are not distinguishable from common water otherwise than by their astringency, and their having a blue scum of an oily or glutinous nature swimming upon the surface of the water. These, in common with the others, bring out particles of coal, more especially in rainy seasons when the springs flow with rapidity. When a number of these kinds are situated from each other in the direction of the strata, as above described; or if the water does not run forth as in springs, but only forms a swamp, or an extension of stagnant water beneath the turf; in either case, it may be depended upon that this water proceeds from a stratum of coal.

Rule 7th. If the stratum of coal is not exposed to view, or cannot be discovered by the first method of searching for the crop, although the appearance of the other strata be very favourable, and afford a strong probability of coal being there; and if the last-mentioned method of judging of the particular place where the crop of the coal may lie, by the springs of water issuing from it, should, from the deficiency of those springs or other circumstances, be thought equivocal, and not give a satisfactory indication of the coal; then a further search may be made in all places where the outward surface, or the stratum of clay or earth, is turned up by ploughing, ditching, or digging, particularly in the lower grounds, in hollows, and by the sides of streams. These places should be strictly examined, to see if any pieces of coal be intermixed with the substance of the superior lax strata; if any such be found, and if they be pretty numerous and in detached pieces, of a firm substance, the angles perfect or not much worn, and the texture of the coal distinguishable, it may be concluded, that the stratum of coal to which they originally did belong is at no great distance, but in a situation higher with respect to the horizon; and if there be also found along with the pieces of coal other mineral matter, such as pieces of shiver or freestone, this is a concurrent proof, that it has come only from a small distance. Though the two fore-mentioned methods should only have produced a strong probability, yet if this last mentioned place, where the pieces of coal, &c. are found in the clay, be in a situation lower than the springs; when this circumstance is joined to the other two, it amounts to little less than a moral certainty of the stratum of coal being a very little above the level of the springs. But if, on the contrary, these pieces of coal are found more

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Coalery. sparingly interspersed in the superior stratum, and if the angles are much fretted or worn off, and very little of other kinds of mineral matter connected with them; it may then be concluded, that they have come from a stratum of coal situated at a greater distance than in the former case; and by a strict search and an accurate comparison of other circumstances, that particular place may be discovered with as much certainty as the other.

After the place is thus discovered, where the stratum of coal is expected to lie concealed, the next proper step to be taken, is to begin digging a pit or hole there perpendicularly down to find the coal. If the coal has no solid strata above and beneath it, but be found only embodied in the clay or other lax matter, it will not be there of its full thickness, nor so hard and pure as in its perfect state when enclosed betwixt two solid strata, the uppermost called the *roof*, and the undermost called the *pavement*, of the coal: in such situation therefore it becomes necessary, either to dig a new pit, or to work a mine forward until the stratum of coal be found included betwixt a solid roof and pavement, after which it need not be expected to increase much in its thickness: yet as it goes deeper or farther to the dip, it most likely will improve in its quality: for that part of the stratum of coal which lies near the surface, or only at a small depth, is often debased by a mixture of earth and sundry other impurities, washed down from the surface, through the backs and cutters, by the rains; whilst the other part of the stratum which lies at a greater depth is preserved pure, by the other solid strata above it intercepting all the mud washed from the surface.

The above methods of investigation admit of many different cases, according to the greater or less number of favourable circumstances attending each of the modes of inquiry; and the result accordingly admits every degree of probability, from the most distant, even up to absolute certainty. In some situations, the coal will be discovered by one method alone; in others, by a comparison of certain circumstances attending each method; whilst in some others, all the circumstances that can be collected only lead to a certain degree of probability.

In the last case, where the evidence is only probable, it will be more advisable to proceed in the search by boring a hole through the solid strata (in the manner hereafter described), than by digging or sinking a pit, it being both cheaper and more expeditious; and in every case, which does not amount to an absolute certainty, this operation is necessary, to ascertain the real existence of the coal in that place.

We shall now suppose, that having examined a certain district, situated within a few miles of the sea or some navigable river, that all the circumstances which offer only amount to a probability of the coal being there, and that boring is necessary to ascertain it; we shall therefore describe the operation of boring to the coal; then the method of clearing it from water, commonly called *winning* it; and all the subsequent operations of working the coal and raising it to the surface, leading it to the river or harbour, and finally putting it on board the ships.

Suppose that the ground, A, B, C, D, fig. 4. has been examined, and from the appearance of the strata where

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Of boring
for the
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Coalery.

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where they are visible (as at the precipice D, and several other places), they are found to be of those kinds usually connected with coal, and that the point to which they rise is directly west towards A, but the ground being flat and covered to a considerable depth with earth, &c. the strata cannot be viewed in the low grounds; therefore, in this and all similar situations, the first hole that is bored for a trial for coal should be on the west side of the ground, or to the full rise of the strata as at A, where, boring down through the strata 1, 2, 3, suppose 10 fathoms, and not finding coal, it will be better to bore a new hole than to proceed to a great depth in that: therefore, proceeding so far to the eastward as B, where the stratum 1, of the first hole, is computed to be 10 or 12 fathoms deep, a second hole may be bored, where boring down through the strata 4, 5, 6, 7, 8, the stratum 1 is met with, but no coal; it would be of no use to bore farther in this hole, as the same strata would be found which were in the hole A: therefore, proceeding again so far to the eastward, as it may be computed the stratum 4 of the second hole will be met with at the depth of 10 or 12 fathoms, a new hole may be bored at C; where, boring through the strata 9, 10, 11, 12, the coal is met with at 13, before the hole proceed so deep as the stratum 4 of the former. It is evident, that, by this method of procedure, neither the coal nor any other of the strata can be passed over, as the last hole is always bored down to that stratum which was nearest the surface in the former hole.

The purposes for which boring is used are numerous, and some of them of the utmost importance in coaleries. In coaleries of great extent, although the coal be known to extend through the whole grounds, yet accidental turns, and other alterations in the dip, to which the coal is liable, render the boring of three or more holes necessary, to determine exactly to what point of the horizon it dips or inclines, before any capital operation for the winning of it can be undertaken; because a very small error in this may occasion the loss of a great part of the coal, or at least incur a double expence in recovering it.

Suppose A, B, C, D, fig. 5. to be part of an extensive field of coal, intended to be won or laid dry by a fire-engine; according to the course of the dip in adjoining coaleries, the point C is the place at which the engine should be erected, because the coal dips in direction of the line AC, consequently the level line would be in the direction CD; but this ought not to be trusted to. Admit two holes, 1, 2, be bored to the coal in the direction of the supposed dip, at 200 yards distance from each other, and a third hole 3 at 200 yards distance from each of them: suppose the coal is found, at the hole 1, to be 20 fathoms deep; at the hole 2, 10 fathoms deeper; but at the hole 3, only 8 fathoms deeper than at 1. Then to find the true level line and dip of the coal, say, As 10 fathoms the dip from 1 to 2, is to 200 yards the distance, so is 8 fathoms, the dip from 1 to 3, to 160 yards, the distance from one on the line 1, 2, to a, the point upon a level with the hole 3. Again say, As 8 fathoms, the dip from 1 to 3, is to 200 yards the distance; so is 10 fathoms, the dip from 1 to 2, to 250 yards, the distance from 1, in direction of the line 1, 3, to b, the point upon a level with the hole 2. Then let fall the

perpendicular 1, c, which will be the true direction of the dip of the coal, instead of the supposed line AC; and by drawing ED, and DF, parallel to the other lines, the angle D, and no other place, is the deepest part of the coal, and the place where the engine should be erected. If it had been erected at the angle C, the level line would have gone in the direction c b, by which means about one third part of the field of coal would have been below the level of the engine and perhaps lost, without another engine was erected at D.

Boring not only shows the depth at which the coal lies, but its exact thickness; its hardness; its quality, whether close burning or open burning, and whether any foul mixture in it or not; also the thickness, hardness, and other circumstances of all the strata bored through; and from the quantity of water met with in the boring, some judgment may be formed of the size of an engine capable of drawing it, where an engine is necessary. When holes are to be bored for these purposes, they may be fixed (as near as can be guessed) in such a situation from each other, as to suit the places where pits are afterwards to be sunk: by which means most of the expence may be saved, as these pits would otherwise require to be bored, when sinking, to discharge their water into the mine below. There are many other uses to which boring is applied, as will be explained hereafter.

For these reasons, boring is greatly practised in England, and is brought to great perfection; and as the operation is generally entrusted to a man of integrity, who makes it his profession, the accounts given by him of the thickness and other circumstances of the strata, are the most accurate imaginable, and are trusted to with the greatest confidence; for as very few gentlemen choose to take a lease of a new coalery which has not been sufficiently explored by boring, it is necessary the accounts should be faithful, being the only rule to guide the landlord in letting his coal, and the tenant in taking it. In Scotland it is not so generally practised; nor are there any men of character who are professed borers, that operation being commonly left to any common workman; whence it happens that it never has been in any esteem, the accounts given by them being so imperfect and equivocal as not to merit any confidence.

The tools or instruments used in boring are very simple. The boring rods are made of iron from 3 to 4 feet long, and about one inch and a half square, with a screw at each end, by which they are screwed together, and other rods added as the hole increases in depth. The chissel is about 18 inches long, and two and a half broad at the end, which being screwed on at the lower end of the rods, and a piece timber put through an eye at the upper end, they are prepared for work. The operation is performed by lifting them up a little, and letting them fall again, at the same time turning them a little round; by a continuance of which motions, a round hole is fretted or worn through the hardest strata. When the chissel is blunt, it is taken out, and a scooped instrument called a *wimble* put on in its stead; by which the dust or pulverised matter which was worn off the stratum in the last operation is brought up. By this substance, the borers know exactly the nature of the stratum they

Coalery. they are boring in; and by any alteration in the working of the rods (which they are sensible of by handling them), they perceive the least variation of the strata. The principal part of the art depends upon keeping the hole clean, and observing every variation of the strata with care and attention.

The established price of boring in England is 5s. per fathom for the first five fathoms, 10s. per fathom for the next five fathoms, and 15s. per fathom for the next five fathoms; and so continually increasing 5s. per fathom at the end of every five fathoms; the borer finding all kinds of boring instruments, and taking his chance of the hardness of the strata, except above one foot in thickness of whin occur, when the former price ceases, and he is paid per day.

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Of winning
the coal.

It is exceedingly uncommon to meet with a stratum of coal which is naturally dry, or whose subterranean springs or feeders of water are so very small as to require no other means than the labour of men to draw off or conduct them away; for it most commonly happens, that the stratum of coal, and the other strata adjacent, abound so much in feeders of water, that, before access can be had to the coal, some other methods must be pursued to drain or conduct away these feeders: therefore, after the deepest part of the coal is discovered, the next consideration is of the best method of draining it, or, in the miner's language, of *winning the coal*.

If the coal lies in such an elevated situation, that a part of it can be drained by a level brought up from the lower grounds, then that will be the most *natural* method; but whether it be the most *proper* or not, depends upon certain circumstances. If the situation of the ground be such, that the level would be of a great length, or have to come through very hard strata, and the quantity of coal it would drain, or the profits expected to be produced by that coal, should be inadequate to the expence of carrying it up; in such case some other method of winning might be more proper. Or suppose, in another case, it be found, that a level can be had to a coalery, which will cost L. 2000, and require five years to bring it up to the coal, and that it will drain 30 acres of coal when completed; yet if it be found that a fire-engine, or some other machine, can be erected on that coalery, for the same sum of money, in one year, which will drain 50 acres of the same coal, then this last would be a more proper method than the level; because four years profit would be received by this method before any could come in by the other; and after the 30 acres drained by the level is all wrought, a machine of some kind would nevertheless be necessary to drain the remaining 20 acres: so that erecting a machine at first would be on all accounts the most advisable.

Where a level can be drove, in a reasonable time, and at an adequate expence, to drain a sufficient tract of coal, it is then the most eligible method of winning; because the charge of upholding it is generally less than that of upholding fire-engines or other machines.

If a level is judged properest after consideration of every necessary circumstance, it may be begun at the place appointed in the manner of an open ditch, about three feet wide, and carried forward until it be about six or seven feet deep from the surface, taking care to secure the bottom and sides by timber-work or build-

ing; after which it may be continued in the manner of a mine about three feet wide, and three feet and a half high, through the solid strata, taking care all along to keep the bottom upon a level, and to secure the roof, sides, and bottom, by timber or building, in all places where the strata are not strong enough to support the incumbent weight, or where they are liable to decay by their exposure to the fresh air. If the mine has to go a very long way before it reach the coal, it may be necessary to sink a small pit, for the convenience of taking out the stones and rubbish produced in working the mine, as well as to supply fresh air to the workmen; and if the air should afterwards turn damp, then square wooden pipes made of dales closely jointed (commonly called *air-boxes*), may be fixed in the upper part of the mine, from the pit-bottom all the way to the end of the mine, which will cause a sufficient circulation of fresh air for the workmen; perhaps in a great length it will be found proper to sink another or more pits upon the mine, and by proceeding in this manner it may be carried forward until it arrive at the coal; and after driving a mine in the coal a few yards to one side, the first coal-pit may be sunk.

If a level is found impracticable, or for particular reasons unadvisable; then a fire-engine*, or some other machine will be necessary, which should be fixed upon the deepest part of the coal, or at least so far towards the dip as will drain a sufficient extent of coal, to continue for the time intended to work the coalery; and whether a fire-engine, or any other machine, is used, it will be of great advantage to have a partial level brought up to the engine-pit, if the situation of the ground will admit it at a small charge, in order to receive and convey away the water without drawing it so high as to the surface: for if the pit was 30 fathoms deep to the coal, and if there was a partial level, which received the water five fathoms only below the surface, the engine by this means would be enabled to draw 1-6th part more water than without it; and if there were any feeders of water in the pit above this level, they might be conveyed into it, where they would be discharged without being drawn by the engine.

The engine-pit may be from seven to nine feet wide; and whether it be circular, oval, or of any other form, is not very material, provided it be sufficiently strong, though a circular form is most generally approved. If any feeders of water are met with a few fathoms from the surface, it will be proper to make a circular or spiral cutting about one foot deep, and a little hollowed in the bottom, round the circumference of the pit, in order to receive and conduct the water down, without flying over the pit and incommoding the workmen. If the strata are of so tender or friable a nature as not to bear this operation, or if the water leaks through them, then it will be necessary to insert in the forementioned cutting a circular piece of timber called a *crib*, hollowed in the same manner to collect the water; and a second may be inserted two or three yards below the first, with a sloping notch down the wall or side of the pit, to convey the water from the former into it; proceeding by some of these methods until the pit is sunk 15 or 20 fathoms; at which place it would be proper to fix a

Coalery.

cistern or reservoir, for the first or upper set of pumps to stand in; for if the pit be 30 fathoms as supposed, it would be too great a length for the pumps to be all in one set from bottom to top; therefore, if any extraordinary feeders are met with, betwixt 15 and 20 fathoms deep, it would be best to fix the cistern where it may receive them, and prevent their descending to the bottom; observing that the upper set of pumps be so much larger than the lower one, as the additional feeders may require; or if there are no additional feeders, it ought then to be a little smaller.

After the upper cistern is fixed, the operation may be pursued by the other set of pumps in much the same manner as has been described, until the pit is sunk to the coal; which being done, it would be proper to sink it six or eight feet deeper, and to work some coal out from the dip side of the pit, to make room for a large quantity of water to collect, without incommoding the coal-pits when the engine is not working.

It would exceed the proper bounds of this article, to enumerate all the accidents to which engine-pits are liable in sinking; we shall therefore only recite a few which seem important.

If a quicksand happen to lie above the solid strata, next the surface, it may be got through by digging the pit of such a wideness at the top (allowing for the natural slope or running of the sand) as to have the proper size of the pit on the uppermost solid stratum; where fixing a wooden frame or tube as the timber-work of the pit, and covering it round on the outside with wrought clay up to the top, the sand may again be thrown into the excavation round the tube, and levelled with the surface.

If the quicksand should happen to lie at a considerable depth betwixt the clay and solid strata, then a strong tube of timber closely jointed and shod with iron, of such a diameter as the pit will admit, may be let down into it; and by fixing a great weight upon the top, and by working out the sand, it may be made to sink gradually, until it come to the rock or other solid stratum below; and when all the sand is got out, if it be lightly calked and secured it will be sufficient.

It sometimes happens, that a stratum of soft matter, lying betwixt two hard solid ones, produces so large a quantity of water as greatly to incommode the operations. In such a case, a frame-work of plank, strengthened with cribs and closely calked, will stop back the whole or the greatest part of it, provided the two strata which include it are of a close texture; or let an excavation of about two feet be made in the soft stratum, quite round the circumference of the pit; and let that be filled close up betwixt the hard strata, with pieces of dry fir-timber about ten inches square inserted endwise, and afterwards as many wooden wedges driven in to them as they can be made to receive; if this be well finished, little or no water will find a passage through it.

It rarely happens that any suffocating damp or foul air is met with in an engine-pit; the falling of water, and the working of the pumps, generally causing a sufficient circulation of fresh air. But that kind of combustible vapour, or inflammable air, which will catch fire at a candle is often met with. It proceeds from the partings, backs, and cutters, of the solid strata,

exhaling from some in an insensible manner, whilst from others it blows with as great impetuosity as a pair of bellows. When this inflammable air is permitted to accumulate, it becomes dangerous by taking fire, and burning or destroying the workmen, and sometimes by its explosion will blow the timber out of the pit, and do considerable damage. If a considerable supply of fresh air is forced down the pit by air-boxes and a ventilator, or by dividing the pit into two by a close partition of deals from top to bottom, or by any other means, it will be driven out, or so weakened, that it will be of no dangerous consequence; or when the inflammable air is very strong, it may be safely carried off by making a close sheathing or lining of thin deals quite round the circumference of the pit, from the top of the solid strata to the bottom, and lengthening it as the pit is sunk, leaving a small vacancy behind the sheathing; when the combustible matter, which exhales from the strata, being confined behind these deals, may be vended by one or two small leaden pipes carried from the sheathing to the surface; so that very little of it can transpire into the area of the pit. If a candle be applied to the orifice of the pipe at the surface, the inflammable air will instantly take fire, and continue burning like an oil-lamp until it be extinguished by some external cause. Upon the whole, every method should be used to make the pit as strong in every part, and to keep it as dry as possible; and whenever any accident happens, it should be as expeditiously and thoroughly repaired as possible, before any other operation be proceeded in, lest an additional one follow, which would more than double the difficulty of repairing it.

The first operations, after sinking the engine-pit, are the working or driving a mine in the coal, and sinking the first coal-pit. The situation of the first coal-pit should be a little to the rise of the engine-pit, that the water which collects there may not obstruct the working of the coals every time the engine stops: and it should not exceed the distance of 20, 30, or 40 yards; because when the first mine has to be driven a long way, it becomes both difficult and expensive. If there be not a sufficient circulation of fresh air in the mine, it may be supplied by the before described air-boxes and a ventilator, until it arrive below the intended coal pit, when the pit may be bored and sunk to the coal, in the manner before mentioned.

After the pit is thus got down to the coal, the next consideration should be of the best method of working it. The most general practice in Scotland is to excavate and take away a part only of the stratum of coal in the first working of the pit, leaving the other part as pillars for supporting the roof; and after the coal is wrought in this manner to such a distance from the pit as intended, then these pillars, or so many of them as can be got, are taken out by a second working, and the roof and other solid strata above permitted to fall down and fill up the excavation. The quantity of coal wrought away, and the size of the pillars left in the first working, is proportioned to the hardness and strength of the coal and other strata adjacent, compared with the incumbent weight of the superior strata.

The same mode of working is pursued in most parts of England, differing only as the circumstances of the coalery.

Coalery.

14
Of Working
the coal.

Coalery. coalery may require: for the English coal, particularly in the northern counties, being of a fine tender texture, and of the close-burning kind, and also the roof and pavement of the coal in general not so strong as in Scotland, they are obliged to leave a larger proportion of coal in the pillars for supporting the roof, during the first time of working; and, in the second working, as many of these pillars are wrought away as can be got with safety.

The Scots coal in general being very hard, and of the open-burning kind, it is necessary to work it in such a manner as to produce as many *great coals* as possible, which is best effected by taking away as high a proportion of the coal as circumstances will allow in the first working; on the contrary, the English coal being very tender, cannot possibly be wrought large, nor is it of much importance how small they are, being of so rich a quality; so that a larger proportion may be left in pillars in this coal than could with propriety be done in the other; and, when all circumstances are considered, each method seems well adapted to the different purposes intended.

The ancient method of working was, to work away as much of the coal as could be got with safety at one working only: by which means the pillars were left so small as to be crushed by the weight of the superior strata, and entirely lost. As great quantities of coals were lost by this method, it is now generally exploded, and the former adopted in its place; by which a much larger quantity of coal is obtained from the same extent of ground, and at a much less expence in the end.

The exact proportion of coal proper to be wrought away, and to be left in pillars at the first working, may be judged of by a comparison of the circumstances before mentioned. If the roof and pavement are both strong, as well as the coal, and the pit about 30 fathoms deep, then two thirds, or probably three-fourths, may be taken away at the first working, and one-third or one fourth left in pillars. If both roof and pavement be soft or tender, then a larger proportion must be left in pillars, probably one-third or near one-half; and in all cases the hardness or strength of the coal must be considered. If tender, it will require a larger pillar than hard coal: because, by being exposed to the air after the first working, a part of it will moulder and fall off, by which it will lose much of its solidity and resistance.

The proportion to be wrought away and left in pillars being determined, the next proper step is to fix upon such dimensions of the pillars to be left, and of the excavations from which the coal is to be taken away, as may produce that proportion. In order to form a just idea of which, see a plan of part of a pit's workings (fig. 6.), supposed to be at the depth of 30 fathoms, and the coal having a moderate rise. A, represents the engine-pit; B, the coal-pit; A a B, the mine from the former to the latter; B C, the first working or excavation made from the coal-pit, commonly called the *winning mine* or *winning headway*, nine feet wide; *b b b b*, &c. the workings called *rooms*, turned off at right angles from the others, of the width of 12 feet; *c c c c*, &c. the workings called *thirlings* or *thirlings*, nine feet wide, wrought through at right angles from one room to another; *d d d*, &c. the pil-

lars of coal left at the first working for supporting the roof, 18 feet long and 12 feet broad; DD, two large pillars of coal near the pit bottom, 15 or 20 yards long and 10 or 15 broad, to support the pit, and prevent its being damaged by the roof falling in; *ee*, the level mine wrought in the coal from the engine pit bottom, four or five feet wide; *ff*, &c. large pillars of coal left next the level, to secure it from any damage by the roof falling in; *gg*, a dike which depressoeth the coal, one fathom; *hh*, &c. large pillars and barriers of coal left unwrought, adjoining to the dike where the roof is tender, to prevent its falling down. The coal taken out by the first working in this pit is supposed to be one-third of the whole; and allowing the rooms 12 feet wide, and the thirlings 9 feet wide, then the pillars will require to be 12 feet wide and 18 feet long; for if one pillar be in a certain proportion to its adjoining room and thirling, the whole number of pillars will be in the same proportion to the whole number of rooms and thirlings in the pit. Suppose ABCD, (fig. 7.), to be a pillar of coal 18 feet long and 12 feet broad, its area will be 216 square feet; ACHE, the adjoining thirling, 12 feet by 9 feet, and its area 108 square feet; BAEFG, the adjoining room, 27 feet long and 12 feet broad, and its area 324 square feet; which added to 108 gives 432 square feet, or two-thirds wrought, and 216 square feet left, or one-third of the whole area FGHD.

It is proper to observe, that in the prosecution of the workings, the rooms to the right of the winning headway should be opposite to the pillars on the left; and the first, third, and fifth pillar, or the second, fourth, and sixth, adjoining to the said headway, should be of such a length as to overlay the adjoining thirlings; as, in the plan, the pillar 2 overlays the thirlings 1 and 3; and the pillar 4, overlays the thirlings 3 and 5; this will effectually support the roof of the main road BC, and will bring the other pillars into their regular order, by which means each pillar will be opposite to two thirlings. Also a larger proportion of coal than common should be left in all places which are intended to be kept open after the second working; such as the pit-bottoms, air-courses, roads, and water-courses, or where the roof is tender; as it generally is near dikes, hitches, and troubles; and if the roof should continue tender for a considerable space, it will perhaps be found proper to leave a few inches of coal adhering to the roof, which, together with a few props of timber fixed under it, may support it effectually for a long time. The level mine *ee*, and the winning headway BC, should be wrought forward a considerable length before the other rooms, in order to be drove through any dikes that might interpose; otherwise the progress of the workings might probably be stopped a considerable time, waiting until a course of new rooms were procured on the other side of the dike. Suppose the dike *gg*, fig. 6. to depress the coal six feet, or one fathom, and that it rises in the same manner on the under side of the dike as it does on the upper side; in such a case, the only remedy would be to work or drive a level mine through the strata of stone from the engine-level at *e*, over the dike, until it intersect the coal at *i*; and from thence to drive a new level mine in the coal at *ii*, and a new winning headway *ih*. In order to gain a new set of rooms,

Coalery. rooms, and to supply fresh air to this new operation, a small mine might be drove from the room *b*, and a hole sunk down upon the level room *ii*; therefore, if the level mine *cc* was not drove so far forward as to have all these operations completed before the rooms and other workings were intercepted by the dike, the working of the pit might cease until these new places were ready.

If there be two or three strata or seams of coal in the same pit (as there often are) having only a stratum of a few feet thick lying betwixt them, it is then material to observe, that every pillar in the second seam be placed immediately below one in the first, and every pillar in the third seam below one in the second; and in such a situation the upper stratum of coal ought to be first wrought, or else all the three together; for it would be unsafe to work the lower one first, lest the roof should break, and damage those lying above.

It sometimes becomes necessary to work the coal lying to the dip of the engine or the level; which coal is consequently drowned with water, and must therefore be drained by some means before it can be wrought. If the quantity of water proceeding from it be inconsiderable, it may then be drained by small pumps laid upon the pavement of the coal, and wrought by men or horses, to raise the water up to the level of the engine-pit bottom: or if the feeders of water be more considerable, and the situation be suitable, the working rod of these pumps might be connected with those in the engine-pit: by which means the water would be raised up to the level: but if the quantity of water be very great; or if, from other circumstances, these methods may not be applicable; then the engine-pit may be sunk as deep below the coal as may be necessary, and a level stone mine drove from its bottom to the dip of the strata, until it intersect the stratum of coal, from whence a new level mine might be worked, which would effectually drain it. Suppose *AB*, fig. 8. to be a section of the engine-pit; *BC*, the coal drained by the engine; *BD*, the coal to the dip of the engine intended to be drained; then if the engine-pit be sunk deeper to *E*, a stone mine may be wrought in the direction *ED*, until it intersect the coal at *D*, by which the water will have a free passage to the engine, and the coal will be drained.

If there be another stratum of coal lying at such a depth below the first as the engine-pit is intended to be sunk to, the upper seam may in some situations be conveniently drained, by driving a mine in the lower seam of coal from *E* to *F*, and another in the upper one from *B* to *D*; and by boring a hole from *D* to *F*, the water will descend to *F*, and filling the mine *EF*, rise up to the engine-pit bottom at *E*, which is upon a level with *D*.

Whenever it is judged necessary to work the pillars, regard must be had to the nature of the roof. If the roof is tender, a narrow room may be wrought through the pillar from one end to the other, leaving only a shell of coal on each side for supporting the roof the time of working. Suppose *ABCD*, fig. 7. to be a pillar of coal 18 feet long and 12 feet broad: if the roof is not strong, the room 1, 2, 3, 4, of eight feet wide, may be wrought up through that pillar, leaving a shell of two feet thick on each side; and if it can be

safely done, a part of these shells may also be wrought away, by working two places through them as at 5 and 6. By this means very little of the coal will be lost; for two-thirds of the whole being obtained by the first working, and above two-thirds of the pillar by the second working, the loss upon the whole would not exceed one-tenth; but it may be observed, that some pillars will not produce so great a proportion, and perhaps others cannot be wrought at all; so that, upon the whole, there may be about one-eighth, one-seventh, or in some situations one-sixth part of the coal lost. If the roof be hard and strong, then as much coal may be wrought off each side and each end of the pillar as can be done with safety, leaving only a small piece standing in the middle; and when the roof is very strong, sometimes several pillars may be taken entirely out, without any loss of coal; and in general this last method is attended with less loss, and produces larger coals, than the former. In all cases it is proper to begin working those pillars first which lie farthest from the pit bottom, and to proceed working them regularly away towards the pit; but if there be a great number of pillars to the dip of the pit, it is the safest method to work these out before those to the rise of the pit are begun with.

There is no great difference in the weight of different kinds of coals, the lightest being about 74 pounds avoirdupois, and the heaviest about 79 pounds the cubic foot; but the most usual weight is 75 pounds the foot, which is 18 hundred weight and 9 pounds the cubic yard. The statute chalders is 53 hundred weight; or when measured is as follows: 268.8 cubic inches to the Winchester gallon; $4\frac{1}{2}$ gallons to the coal peck, about 3 pounds weight; 8 coal pecks to the boll, about 247 $\frac{1}{2}$ pounds; and 24 bolls to the chalders, of 53 hundred weight. If one coal measuring exactly a cubic yard (nearly equal to 5 bolls) be broken into pieces of a moderate size, it will measure seven coal bolls and a half. If broken very small, it will measure 9 bolls; which shows, that the proportion of the weight to the measure depends upon the size of the coals; therefore accounting by weight is the most rational method.

A TABLE of the weight and quantity of coal contained in one acre Scots measure, allowing one sixth part to be lost below ground, in seams of the following thicknesses.

Thickness of coal, Feet.	Inches.	Weight in tons.	Quantity in chalders.
2	0	3068	1158
2	6	3835	1447
3	0	4602	1736
3	6	5369	2025
4	0	6136	2314
4	6	6903	2603
5	0	7670	2892
5	6	8437	3181
6	0	9204	3470

We shall next mention some of the various methods of bringing the coals from the rooms and other workings to the pit bottom. Where the stratum of coal is of a sufficient thickness, and has a moderate rise and dip, the coals are most advantageously brought out by horses, who draw out the coals in a tub or basket placed

Coalery. and upon a sledge: a horse by this means will bring out from four to eight hundred weight of coals at once, according to the quantity of the ascent or descent. In some coaleries they have access to the workings by a mine made for them, sloping down from the surface of the earth to the coal; and where that convenience is wanting, they are bound into a net, and lowered down the pit. If the coal be not of such a height as to admit horses, and has a moderate rise like the last, then men are employed to bring out the coals: they usually draw a basket of four or five hundred weight of coals, fixed upon a small four-wheeled carriage. There are some situations in which neither horses nor men can be properly used; particularly where the coal has a great degree of descent, or where many dikes occur: in such a case the coals are best brought out by women called *bearers*, who carry them in a kind of basket upon their backs, usually a hundred, or a hundred weight and a half at once.

When the coals are brought to the pit bottom, the baskets are then hooked on to a chain, and drawn up the pit by a rope to the surface, which is best effected by a machine called a *gin*, wrought by horses. There are other kinds of gins for drawing coals, some wrought by water, others by the vibrating lever of a fire-engine; but either of these last is only convenient in some particular situations, those wrought by horses being in most general use. After the coals are got to the surface, they are drawn a small distance from the pit, and laid in separate heaps: the largest coals in one heap, the smaller pieces called *chevs* in another, and the *culm* or *pan-coal* in a separate place.

15
Of crushes
and fitts.

There is an accident of a very dangerous nature to which all coaliers are liable, and which has been the ruin of several: it is called a *crush*, or a *fitt*. When the pillars of coal are left so small as to fail, or yield under the weight of the superior strata; or when the pavement of the coal is so soft as to permit the pillars to sink into it, which sometimes happens by the great weight that lies upon them; in either case the solid stratum above the coal breaks and falls in, crushes the pillar to pieces, and closeth up a great extent of the workings, or probably the whole coalery. As such an accident seldom comes on suddenly, if it be perceived in the beginning, it may sometimes be stopped by building large pillars of stone amongst the coal pillars: but if it has already made some progress, then the best method is to work away as many of the coal pillars adjoining to the crush as may be sufficient to let the roof fall freely down; and if it makes a breach of the solid strata from the coal up to the surface, it will very probably prevent the crush from proceeding any farther in that part of the coalery. If the crush begins in the rise part of the coalery, it is more difficult to stop it from proceeding to the dip, than it is to stop it from going to the rise when it begins in a contrary part.

Foul air.

Another circumstance proper to be taken notice of is the foul or adulterated air so often troublesome in coaleries. Of this there are two kinds: the black damp or styth, which is of a suffocating nature; and the inflammable or combustible damp. Without staying to inquire, in this place, into the origin and effects of these damps, it may be sufficient to observe, that, in whatever part of any coalery a constant supply or a circulation of fresh air is wanting, there some of

these damps exist, accumulate in a body, and become noxious or fatal: and whenever there is a good circulation of fresh air, they cannot accumulate, being mixed with and carried away by the stream of air as fast as they generate or exhale from the strata. Upon these principles are founded the several methods of ventilating a coalery. Suppose the workings of the pits A and B (fig. 6.) to be obnoxious to the inflammable damps; if the communication was open betwixt the two pits, the air which went down the pit A would proceed immediately along the mine *a*, and ascend out of the pit B; for it naturally takes the nearest direction: so that the air in all the workings would be stagnant; and they would be utterly inaccessible from the accumulation of the combustible damp. In order to expel this, the air must be made to circulate through all the different rooms by means of collateral air-courses made in this manner: The passage or mine *a* must be closed up or stopped by a partition of deals, or by a wall built with bricks or stones, to prevent the air passing that way. This building is called a *stopping*. There must also be stoppings made in the thirlings 1 1, &c. betwixt the pillars *ff*; &c. which will direct the air up the mine *ee*, until it arrive at the innermost thirling 2, which is to be left open for its passage. There must also be stoppings made at the side of the mine *a* at *mm*, and on both sides of the main headway BC at *bb*, &c. then returning to the innermost thirling 2, proceed to the third row of pillars, and build up the thirlings 2 2, &c. leaving open the thirling 3 for a passage for the air; and proceeding on to the fifth row of pillars, build up in the same manner the stoppings 3 3, &c. leaving open 4 for an air course; and by proceeding in this manner to stop up the thirlings or passages in every other row of pillars, the current of fresh air will circulate through and ventilate the whole workings, in the direction pointed to by the small arrows in the plan, cleaning away all the damps and noxious vapours that may generate. When it is arrived at C, it is conducted across the main headway, and carried through the other part of the pit's workings in the same manner, until it return through *nn* to the pit B, where it ascends; and as the rooms advance farther, other stoppings are regularly made.

In some of those stoppings, on the sides of the main headway, there must be doors to admit a passage for the bringing out of the coals from the rooms to the pit, as at 5 5: these doors must be constantly shut, except at the time of passing through them.

There are other methods of disposing the stoppings so as to ventilate the pit; but none which will so effectually disperse the damps as that described above. If the damps are not very abundant, then the course of stoppings 1 1, &c. in the level mine, and the others at *bbb*, &c. in the main headway, without any others, may perhaps be sufficient to keep the pit clear. If at any time the circulation of the fresh air is not brisk enough, then a large lamp of fire may be placed at the bottom of the pit B, which, by rarefying the air there, will make a quicker circulation.

Most of the larger coaleries send their coals to the ships for the coasting trade or exportation; and, as the quantity is generally very large, it would take a greater number of carts than could conveniently be obtained at all times to carry them; besides the considerable expence

Plate
EXLII.

16

Of leading
and ship-
ping the
coals.

Coalery.
Coallier.

of that manner of carriage: they therefore generally use waggons, for carrying them along waggon ways, laid with timber; by which means one horse will draw from two to three tons at a time, when in a cart not above half a ton could be drawn.

The first thing to be done in making a waggon-way is to level the ground in such a manner as to take off all sudden ascents and descents: to effect which, it is sometimes necessary to cut through hills, and to raise an embankment to carry the road through hollows. The road should be formed about 12 feet wide; and no part should have a greater descent than of one yard perpendicular in 10 of a horizontal line, nor a greater ascent than one yard in 30. After the road is formed, pieces of timber, about six feet long and six inches diameter, called *sleepers*, are laid across it, being 18 or 24 inches distant from each other. Upon these sleepers other pieces of timber, called *rails*, of four or five inches square, are laid in a lateral direction, four feet distant from each other, for the waggon-wheels to run upon; which being firmly pinned to the sleepers, the road may then be filled with gravel and finished.

The waggons have four wheels, either made of solid wood or of cast iron. The body of the carriage is longer and wider at the top than at the bottom; and usually has a kind of trap-door at the bottom, which, being loosed, permits the coals to run out without any trouble. The size of a waggon to carry 50 hundred weight of coals is as follows:

	Feet.	Inches.
Length of the top,	7	9
Breadth of the top,	5	0
Length of the bottom,	5	0
Breadth of the bottom,	2	6
Perpendicular height,	4	3

Where the pits are situated at some considerable distance from the harbour, it becomes necessary to have a store-house near the shipping place, where the coals may be lodged, until the lighters or ships are ready to take them in. The waggon-way should be made into the store-house, at such a height from the ground, as to permit the coals to run from the waggons down a spout into the vessels; or else to fall down into the store-house, as occasion may require.

This kind of store-house is well adapted to dispatch and saving expence: for a waggon-load of coals may be delivered either into the store-house or vessels instantly with very little trouble: and if the coals were exposed to the effects of the sun and rain, they would be greatly injured in their quality; but being lodged under cover of the store-house, they are preserved.

COALESCENCE, the union or growing together of two bodies before separate. It is principally applied to some bones in the body, which are separate during infancy, but afterwards grown together; or to some morbid union of parts, which should naturally be distinct from each other. Thus there is a coalescence of the sides of the vulva, anus, and nares; of the eye-lids, fingers, toes, and many other parts.

COALLIER, a vessel employed to carry coals from one port to another; chiefly from the northern parts of England to the capital, and more southerly parts, as well as to foreign markets. This trade is known to be an excellent nursery for seamen; although they

are often found, from the constitution of their climate, Coamings not to be so well calculated for southern navigation.

COAMINGS, in ship-building, are those planks, or that frame, forming a border round the hatches, which raise them up higher than the rest of the deck. Loop-holes, for muskets to shoot out at, are often made in the coamings, in order to clear the deck of the enemy when the ship is boarded.

COANE, among the Greeks, a name given to a peculiar species of *tutia* or *tutty*, which was always found in a tubular form. It had its name from *κωνη*, a word used to express a sort of cylindric tube, into which the melted brass was received from the furnace, and in which it was suffered to cool. In cooling, it always deposited a sort of recement on the sides of the vessel or tube, and this was the *tutty* called *coane*.

COAST, a sea-shore, or the country adjoining to the edge of the sea. Dr Campell, in his political survey of Great Britain, considers an extensive sea-coast as of great advantage to any kingdom; and consequently that this island hath many conveniences resulting from the extent of its coasts, superior to other kingdoms which are much larger. The chief advantages arising from an extensive sea-coast are, that thus there is a convenient opportunity for exportation and importation to or from all parts of the kingdom. Thus, a number of cities are formed on the coasts; by this means the internal parts are improved, &c. The extent of the sea-coasts of Arabia, he looks upon as the genuine source of wealth and splendour to the ancient inhabitants of that peninsula; the same was the instrument of the greatness of ancient Egypt, of Phœnicia, &c. In short, according to him, no country or city can for any length of time be flourishing unless it hath a considerable connection with the sea.

"It is indeed true (says he) that the wisdom and industry of man, taking hold of some peculiar circumstances, may have rendered a few inland cities and countries very fair and flourishing. In ancient history we read of Palmyra, and the district round it, becoming a luxuriant paradise in the midst of inhospitable deserts. But this was no more than temporary grandeur; and it has now lain for some ages in ruins. The city and principality of Kandahar was in like manner rendered rich and famous, in consequence of its being made the centre of the Indian commerce; but, long ago declining, its destruction has been completed, in our days, from that dreadful desolation which Thamas Kouli Khan spread through Persia and the Indies. Here, in Europe, many of the large cities in Germany, which for a time made a great figure from the freedom and industry of the inhabitants, and diffused ease, plenty, and prosperity, through the districts dependent on them, which of course rendered them populous, are now so much sunk, through inevitable accidents, as to be but shadows of what they were; and though they still continue to subsist, subsist only as the melancholy monuments of their own misfortunes. We may therefore, from hence, with great certainty, discern, that all the pains and labour that can be bestowed in supplying the defect of situation in this respect, proves, upon the whole, but a tedious, difficult, and precarious expedient. But, however, we must at the same time admit, that it is not barely

the

Cape-Coast the possession even of an extended coast that can produce all these desirable effects. That coast must likewise be distinguished by other natural advantages; such as capes and promontories, favourably disposed to break the fury of the winds; deep bays, safe roads, and convenient harbours. For, without these, an extended coast is no more than a maritime barrier against the maritime force of other nations; as is the case in many parts of Europe: and is one of the principal reasons why Africa derives so little benefit from a situation which has so promising an appearance; there being many considerable tracts upon its coasts, equally void of havens and inhabitants, and which afford not the smallest encouragement to the attempting any thing that might alter their present desolate condition. It is, however, a less inconvenience, and in some cases no inconvenience at all, if, in the compass of a very extended coast, there should be some parts difficult or dangerous of access, provided they are not altogether inaccessible.—The sea-coast of Britain, from the figure, in some measure, of the island, but chiefly from the inlets of the sea, and the very irregular indented line which forms its shore, comprehends, allowing for those sinuosities, at least 800 marine leagues: we may, from hence, therefore, with safety affirm, that in this respect it is superior to France, though that be a much larger country; and equal to Spain and Portugal in this circumstance, though Britain is not half the size of that noble peninsula, which is also singularly happy in this very particular.

CAPE-COAST, the name of the chief British settlement on the coast of Guinea in Africa. The name is thought to be a corruption of *Cabo Corso*, the ancient Portuguese appellation. This cape is formed by an angular point, washed on the south and east by the sea, on which stands the English fort. Here the Portuguese settled in 1610, and built the citadel of Cape-Coast upon a large rock that projects into the sea. A few years afterwards they were dislodged by the Dutch, to whom this place is principally indebted for its strength. In 1664 it was demolished by Admiral Holmes, and in 1665 the famous Dutch Admiral De Ruyter was ordered by the States to revenge the insults of the English. With a squadron of 13 men of war, he attacked all the English settlements along the coast; ruined the factories; and took, burnt, and sunk, all the shipping of the English Company: however, after all his efforts, he was baffled in his attempts on Cape-Coast. By the treaty of Breda it was confirmed to the English, and the king granted a new charter in 1672; on which the Company applied all their attention to the fortifying and rendering it commodious.

COASTING, in navigation, the act of making a progress along the sea-coast of any country. The principal articles relating to this part of navigation are, the observing the time and direction of the tide; knowledge of the reigning winds; of the roads and havens; of the different depths of the water, and qualities of the ground.

COASTING-Pilot, a pilot who by long experience has become sufficiently acquainted with the nature of any particular coast, and of the requisites mentioned in the preceding article, to conduct a ship or fleet from one part of it to another.

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COAT, or **COAT of ARMS**, in heraldry, a habit worn by the ancient knights over their arms both in war and tournaments, and still borne by heralds at arms. It was a kind of fur-coat, reaching as low as the navel, open at the sides, with short sleeves, sometimes furred with ermine and hair, upon which were applied the armories of the knights embroidered in gold and silver, and enamelled with beaten tin coloured black, green, red, and blue; whence the rule never to apply colour on colour, nor metal on metal. The coats of arms were frequently open, and diversified with bands and fillets of several colours, alternately placed, as we still see cloths scarleted, watered, &c. Hence they were called *devises*, as being divided and composed of several pieces sewed together: whence the words *false*, *pale*, *chevron*, *bend*, *cross*, *saltier*, *lozenge*, &c. which have since become honourable pieces, or ordinaries of the shield. See **CROSS**, **BEND**, **CHEVRON**, &c.

Coats of arms and banners were never allowed to be worn by any but knights and ancient nobles.

COAT, in anatomy. See **TUNIC** and **EYE**.

COAT of Mail, a kind of armour made in form of a shirt; consisting of iron rings wove together netwise. See **MAIL**.

COATI, in zoology, a synonyme of a species of **VERRA**, and **URSUS**.

COATIMUNDI, a variety of the above.

COATING, among chemists. See **CHEMISTRY**, n° 580.

COATING of Vials, Panes of Glass, &c. among electricians, is usually performed by covering the outside of the vial with tinfoil, brass or gold-leaf, &c. and filling its inside with loose pieces of brass-leaf, by which means it becomes capable of being charged. See **ELECTRICITY**.

COATZONTECOXOCHITL, or *Flower with the viper's head*, in botany, a Mexican flower of incomparable beauty. It is composed of five petals or leaves, purple in the innermost part, white in the middle, the rest red but elegantly stained with yellow and white spots. The plant which bears it has leaves resembling those of the iris, but longer and larger; its trunk is small and slim: this flower was one of the most esteemed amongst the Mexicans. The Lincean academicians of Rome, who commented on and published the History of Hernandez in 1651, and saw the paintings of this flower, with its colours, executed in Mexico, conceived such an idea of its beauty, that they adopted it as the emblem of their very learned academy, denominating it *Fior di Lince*. See **PLATE CXLIII**.

COBALT, one of the semimetals, according to Cronstedt, of a whitish-grey colour, nearly resembling fine hardened steel, and of the specific gravity of 6.000; but according to others, of a bluish grey, or reddish white colour, and of the specific gravity of 7.700. It is as difficult of fusion as copper, or even gold; and when well purified, scarcely yields to iron itself in this respect. When slowly cooled, it crystallizes, forming on its surface small bundles of needles or needle-formed prisms, laid on one another, and united into bundles; greatly resembling, according to Mongez, a mass of shaken basalt. In order to succeed in this crystallization, it is sufficient to melt the cobalt in a crucible till it suffers a kind of ebullition; and, after having

Coat
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Cobalt.

Cobalt.

taken it from the fire, to incline the vessel while the surface of the semimetal is congealing. By this inclination the portion of metal still fused is poured out, and that which adheres to this kind of geode formed by the cooling of the surfaces of the cobalt is found covered with the crystals sought for. When melted with borax it affords a blue glass, which is the most obvious method of distinguishing its ores amongst all others. It cannot be calcined without considerable difficulty; and the calx, though black in appearance, is in reality of a deep blue. This calx, melted with borax, or potash and siliceous sand, affords the blue glass called *smalt*, very much used in enamel painting and tinging of other glass, being the most fixed of all colours in the fire.

Cobalt, when calcined along with the calx of arsenic in a gentle heat, assumes a red colour. The same is naturally produced by way of efflorescence, and is then called the *bloom* or *flowers* of cobalt. When cobalt and arsenic are melted in a strong fire, they burn with a blue flame. It does not mix either with mercury by any means hitherto known, nor will it form any union with bismuth without the addition of some medium. It is easily soluble in spirit of nitre, and the solution either in this or any other acid is of a red colour; and it is observable that the colour of the acid solutions of this semimetal, instead of fading by dilution with water, becomes more vivid. It is precipitated of a pale red colour from its solutions by acid of sugar, which has the greatest attraction for it; though acid of sorrel likewise precipitates it.

Cronstedt, in speaking of this semimetal, makes mention of native cobalt; but other mineralogists assure us that it has never been found perfectly pure in the bowels of the earth. What passes for such, is said by Kirwan to be mineralized by arsenic. That called the *grey* cobalt ore comes nearest to the purity of the native semimetal, but always holds some quantity of arsenic and iron. It is found in Sweden, Saxony, Norway, and England, particularly at Mendip hills in Somersetshire, and in Cornwall, where Dr Lewis says it has lately been dug up in large quantities. Here it is sometimes found in conjunction with bismuth, and sometimes without it, resembling very much in appearance the Saxon ores from Schnuberg in Misnia, and produces the finest blue colours by proper management. An arsenicated grey cobalt ore has also been found at Chatelaudren in France.

This kind of ore is solid, heavy, and compact, sometimes dull and sometimes of a bright appearance, crystallized frequently in a tessular and sometimes in a dendritical form; being generally hard enough to strike fire with steel, when an arsenical smell is perceived. It grows black in the fire, is soluble with effervescence in the nitrous acid, from which it may be precipitated by the marine, and afford the *Sympathetic Ink* mentioned under the article CHEMISTRY, n° 822. This and the blue colour communicated by it to glass are indeed the two characteristics by which the ores of cobalt are distinguished from other arsenical ores.

The most common ore of cobalt is that called the *black* or *vitreous ore*, and *Kobalt Mulm* or *Schlacken Kobalt* by the Germans. It is found in a loose powdery form, sometimes resembling lamp-black, sometimes of a grey colour, in which state it is called *cobalt*

ochre; but when in scoriform half vitrified masses, it obtains the name of *vitreous* or *glassy ore*. When this kind of ore contains any sulphur or arsenic, they are only mechanically mixed with it. A small portion of copper, however, is sometimes found in it. It is frequently embodied in stones or sands of a black colour; sometimes it is contained in argillaceous earths of a blue or green colour. Talc, chalk, and gypsum, impregnated with it, are called by the same name; and by some *spiegel cobalt*.

3. Cobalt, mineralised by the *arsenical acid*, is found either loose and pure, or mixed with chalk or gypsum, or indurated and crystallized in tetrahedral crystals. It is also found in a stalactitical form. It melts easily, and then becomes blue. It frequently invests other cobaltic ores; and is found sometimes in stone and sand. From the experiments of Bergman it appears, that the arsenical acid, and not the calx of arsenic, enters into this combination; for cobalt is never red but when united to an acid. Flowers of cobalt, mineralised by arsenic without any silver, and intermixed with galena, have also been discovered in France.

The flowers or efflorescence of cobalt are often found of a red colour, like other earths, spread very thin on the cobalt ores; and is when of a pale colour, erroneously called flowers of bismuth. A white cobalt earth or ochre is said to have been found, and examined by a celebrated mineralogist, who found it to resemble the cobalt flowers in every respect except the colour; and indeed it is possible that in these flowers the colour might by length of time, or some other accident, have lost their colour. The indurated flowers of cobalt are commonly crystallized in form of deep red semitransparent rays or radiations. It is found at Schnuberg in Saxony.

Cobalt, mineralised by *sulphurated iron*, is of a colour nearly resembling tin or silver. It is sometimes found in large masses, sometimes in grains crystallized of a dull white colour, and frequently has the appearance of *mispickles*. It has no mixture of arsenic. By calcination it becomes black and not red, which distinguishes it from the pyrites; and it contains so little sulphur, that none can be extracted from it. When dissolved in aqua-regia the solution is yellow, but becomes green when boiling hot; which alternation, says Kirwan, is peculiar to marine cobalt. A coarse grained kind of this ore, found in Sweden, becomes slimy in the fire, and sticks to the iron rods employed in stirring it while calcining. The slaggy kind contains a large quantity of iron, and affords a very beautiful colour as well as the former.

Cobalt, mineralised by *sulphur, arsenic, and iron*, has a great resemblance to the harder kinds of grey cobalt ore, formerly mentioned; but it is never hard enough to strike fire with steel, and sometimes may even be scraped with a knife. The most shining kinds of this and the former species are called *cobalt glantz*.

The great consumption of cobalt is for the permanent blue colour which it communicates to glasses and enamels, either upon metals, porcelains, or earthen wares of any kind. It is the same blue prepared in a very cheap way by the Dutch, chiefly from the coarse glass or blue glass of cobalt, and called *azur de Hollande* by the French, and which is employed by laundresses.

Cobalt.

Cobalt dresses. But although cobalt is applied to few or no other purposes, the quantities consumed in this way afford sufficient profit to those who have cobalt mines in their possession.

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Coblentz.

Ores of cobalt, as has already been said, are met with in many parts of Europe. The greatest quantities are found near Schnuberg in the district of Misnia in Saxony; also at St Andreasberg in the Upper Hartz, where large quantities have been met with for upwards of 30 years past. Formerly an iron ore only was found in this place; but about the beginning of the 14th century, on sinking deeper, it was succeeded by a very rich ore of silver; which also being in length of time exhausted, gave place to cobalt ores. Some pieces, however, are still found in these mines that contain silver and gold.

The general method of preparing cobalt ores in the large way seems confined to Saxony alone; from whence all other parts of the world, even the East Indies, are constantly supplied. It is supposed that the Chinese, and more particularly the Japanese, had formerly mines of excellent cobalt, with which the fine blues of their ancient porcelains were painted; but it appears that these mines are now exhausted, and that the inferior blues of their present wares are painted with the Saxon zaffre imported to them by the Dutch. For the management of the ore in such a manner as to fit it for giving the desired colour, see the article **ZAFFRE**.

When cobalt is united to bismuth, by means of nickel, the compound is called *speiss*. This name is also given to a mixture of cobalt, nickel, bismuth, sulphur, and arsenic.

In Germany and Saxony, the word cobalt is applied to the damps, arsenical vapours, and their effects on the miners; which has induced the vulgar to apply it to an evil spirit whom they supposed to dwell in the mines.

Regulus of COBALT, a kind of semimetal prepared from cobalt, of a whitish colour inclining to red. See **ZAFFRE**; and **CHEMISTRY**, n° 1294, &c.

COBBING, a punishment sometimes inflicted at sea. It is performed by striking the offender a certain number of times on the breech with a flat piece of wood called the *cobbing-board*. It is chiefly used as a punishment to those who quit their station during the period of the night-watch.

COBITIS, the **LOACHE**, in ichthyology, a genus of fishes belonging to the order of abdominales. The eyes are in the upper part of the head; the branchiostegic membrane has from four to five rays; and the body is nearly of an equal thickness throughout. The species are five; three of which are natives of Europe. The loache is found in several of our small rivers, keeping at the bottom on the gravel; and is on that account, in some places, called the *groundling*: It is frequent in the stream near Amesbury in Wiltshire, where the sportsmen, through frolic, swallow it down alive in a glass of white-wine.

COBLE, a boat used in the turbot fishery, twenty feet six inches long, and five feet broad. It is about one ton burden, rowed with three pair of oars, and admirably constructed for encountering a mountainous sea.

COBLENTZ, an ancient, handsome, and strong

town of Germany, in the electorate of Triers or Treves, seated at the confluence of the rivers Rhine and Moselle, in a fertile country, with mountains covered with vineyards. It is the usual residence of the elector of Treves, to whom it belongs. Over the Rhine is a bridge of twelve arches, built for the convenience of the inhabitants of Coblentz and the adjacent places. A ferry machine is constantly going from the city to the other side of the Rhine, where there is a little town and very strong castle built on an eminence named *the rock of honour*. This machine is erected on two boats, in the form of a large square gallery, encompassed with ballustrades; and carries a tall flag-staff, on which are displayed the arms of the electorate of Treves. It is put in motion by the ferry-man's pulling a rope, which is fixed to a standard on each side the river. The castle appears to be almost inaccessible to an enemy, and entirely commands the city of Coblentz. The archbishop's palace stands at the foot of this rock, and the arsenal at a little distance. E. Long. 7. 18. N. Lat. 50. 24.

COBOE, the name of a dish among the Moors. It is made of several pieces of mutton wrapt up in the cawl, and afterwards roasted in it; the poorer people, instead of the meat, use the heart, liver, and other parts of the entrails, and make a good dish, though not equal to the former.

COBOOSE, in sea-language, is derived from the Dutch *kambuis*, and denotes a sort of box, resembling a sentry-box, used to cover the chimneys of some merchant ships. It generally stands against the barricade, on the fore-part of the quarter deck. It is called in the West Indies *cobre vega*.

COBURG, a town of Germany in the circle of Franconia, and capital of a territory of the same name, with a famous college, a fort, and a castle. This town, with its principality, belongs to the house of Saxony, and the inhabitants are Protestants. It is seated on the river Itch, in E. Long. 11. 5. N. Lat. 50. 20.

COBWEB, in physiology, the fine net-work which spiders spin out of their own bowels, in order to catch their prey. See **ARANEAE**.

COCCEIUS (John), professor of theology at Bremen, was founder of a sect called *Cocceians*; they held, amongst other singular opinions, that of a visible reign of Christ in this world, after a general conversion of the Jews and all other people to the true Christian faith, as laid down in the voluminous works of Cocceius. He died in 1699, aged 66.

COCCINELLA, in zoology, a genus of insects of the order of coleoptera; the characters of which are these: The antennæ are subclavated: the palpi are longer than the antennæ, the last articulation heart-shaped; the body is hemispheric; the thorax and elytra are margined; the abdomen is flat. This genus is divided into sections, from the colour of the elytra, and of the spots with which they are adorned. The females, impregnated by the males, deposit their eggs, which turn to small larvæ, slow in their progress, and are enemies to the plant-louse. Those larvæ are frequently round upon leaves of trees covered with plant-lice. On the point of being metamorphosed, they settle on a leaf by the hinder part of their body, then bend and swell themselves, forming a kind of hook. The skin extends, grows hard; and in a fortnight's time the chrysalis opens

Cobols.
||
Coccinella.

Plate
CXLIII.

Coccolobo
||
Coccus.

opens along the back. The insect in its perfect state receives the impressions of the air, that gives its elytra a greater degree of consistence. It seldom flies, and cannot keep long on the wing. Of all the different larvæ of the coccinella, the most curious is the white hedgehog, a name given it by M. de Reaumur on account of the singularity of its figure, and the tufts of hair which render it remarkable. It seeks its food on the leaves of trees. After a fortnight, it settles on one spot, and without parting with its fur, turns to a chrysalis; three weeks after which, it becomes a coccinella. The slough appears nowise impaired by its transformation. M. de Reaumur has observed it on a plum-tree. It is likewise found upon the rose-tree.

When the coccinellæ first arrive at the state of perfection, the colours of their elytra are very pale, nearly bordering upon white or cream colour; and the elytra are very soft and tender, but soon grow hard, and change to very lively brilliant colours. Their eggs are of an oblong form, and of the colour of amber.

COCOLOBO, in botany: A genus of the trigynia order, belonging to the octandria class of plants; and in the natural method ranking under the 12th order, *Holoracea*. The calyx is quinquepartite and coloured; there is no corolla; the berry is formed of the calyx, and is monospermous. The species called *uvifera*, or *sea-side grape*, grows upon the sandy shores of most of the West India islands, where it sends up many woody stems, eight or ten feet high, covered with a brown smooth bark, and furnished with thick, veined, shining, orbicular leaves, five or six inches diameter, standing upon short foot-stalks. The flowers come out at the wings of the stalks, in racemi of five or six inches long; they are whitish, have no petals, but each is composed of a monophyllous calyx, cut at the brim into five oblong obtuse segments, which spread open, continue, and surround seven or eight awl-shaped stamina, and three short styles, crowned with simple stigmata. The germen is oval, and becomes a fleshy fruit, wrapped round by the calyx, and includes an oval nut or stone. These plums are about the size of gooseberries, of a purple red colour, and a tolerable good flavour. There are some other species of this genus whose fruits are eaten by the inhabitants where they grow, but they are smaller and not so well tasted.

COCOTHRAUSTES, in ornithology, the trivial name of a species of *LOXIA*.

COCULUS INDICUS, the name of a poisonous berry, too frequently mixed with malt liquors in order to make them intoxicating; but this practice is expressly forbidden by act of parliament. It is the fruit of the *MENISPERMUM Coccus*. Fishermen have a way of mixing it with paste: this the fish swallow greedily, and are thereby rendered lifeless for a time and float on the water. The good women use it with stavesacre, for destroying vermin in childrens heads.

Plate
CXLIII.

COCCUS, in zoology, a genus of insects belonging to the order of hemiptera. The rostrum proceeds from the breast; the belly is bristly behind; the wings of the male are erect; and the female has no wings. The species are 22, denominated principally from the plants they frequent. The most remarkable species are:

1. The coccus hesperidum, or green-house bug, which

is oval, oblong, of a brown colour, covered with a kind of varnish: it has six legs; with a notch and four bristles at the tail. It infests orange-trees and other similar plants in green-houses. When young, it runs upon the trees; but afterwards fixes on some leaf, where it hatches an infinity of eggs, and dies. The male is a very small fly.

2. The coccus phalarides. The male of this species is small. Its antennæ are long for its size. The feet and body are of a reddish colour, nearly pink, and sprinkled with a little white powder. Its two wings, and the four threads of its tail, are snow white, and of those threads two are longer than the rest. It is to be found upon the species of gramin which Linnæus calls *phalaris*. The female contrives, along the stalks of that dog-grass, little nests, of a white cottony substance, in which she deposits her eggs. The small threads of her tail are scarce perceptible.

3. The coccus casti, a native of the warmer parts of America, is the famous cochineal animal, so highly valued in every part of the world for the incomparable beauty of its red colour, which it readily communicates to wool and silk, but with much more difficulty to linen and cotton. This insect, like all others, is of two sexes, but exceedingly dissimilar in their appearance. The female, which alone is valuable for its colour, is ill-shaped, tardy, and stupid: its eyes, mouth, and antennæ, are fixed so deep, and are so concealed in the folds of the skin, that it is impossible to distinguish them without a microscope. The male is very scarce, and is sufficient for 300 females or more; it is active, small, and slender, in comparison with the female; its neck is narrower than the head, and still narrower than the rest of the body. Its thorax is of an elliptic form, a little longer than the neck and head put together, and flattened below; its antennæ are jointed, and out of each joint issue long slender hairs that are disposed in pairs on each side. It has six feet, each formed of distinct parts. From the posterior extremity of its body two large hairs or bristles are extended, which are four or five times the length of the insect. It bears two wings, that are fixed to the upper part of the thorax, which falls like the wings of common flies when it walks or rests. These wings, which are of any oblong form, are suddenly diminished in breadth where they are connected to the body. They are strengthened by two oblong muscles, one of which extends itself on the outside all round the wing; and the other, which is internal and parallel to the former, seems interrupted towards the summit of the wings. The male is of a bright red; the female of a deeper colour. They are bred on a plant known in Oaxaca in New Spain, and all those parts where it abounds, by the name of *nopal*, or *nopalleca*, the Indian fig-tree. See *CACTUS*.

The cochineal was formerly imagined to be a fruit or seed of some particular plant; an error which probably arose from an ignorance of the manner in which it is propagated; but at present every one is convinced of its being an insect, agreeably to its name, signifying a wood-louse, which generally breeds in damp places, especially in gardens. These insects, by rolling themselves up, form a little ball something less than a pea: and in some places are known by the name of *baquillas de San Anton*, i. e. "St Anthony's little

Coccus. little cows:" and such is the figure of the cochineal, except that it has not the faculty of rolling itself up; and its magnitude, when at its full growth, does not exceed that of a tick common in dogs and other animals.

The juice of the plant on which these insects breed is their sole nourishment, and becomes converted into their substance; when, instead of being thin and watery, and to all outward appearance of little or no use, it is rendered of a most beautiful crimson colour. The plant is in May or June in its most vigorous state, and at this most favourable season the eggs are deposited among the leaves. In the short space of two months, from an animalcule, the insect grows up to the size above mentioned: but its infant state is exposed to a variety of dangers: the violent blasts of the north wind sweep away the eggs from the foliage of the plant: and, what is equally fatal to their tender constitutions, showers, fogs, and frosts, often attack them, and destroy the leaves, leaving the careful cultivator this only resource, namely, that of making fires at certain distances, and filling the air with smoke, which frequently preserves them from the fatal effects of the inclemency of the weather.

The breeding of cochineal is also greatly obstructed by birds of different kinds, which are very fond of these insects; and the same danger is to be apprehended from the worms, &c. which are found among the plantations of nopals: so that unless constant care be taken to fright the birds away from the plantation, and to clear the ground of those various kinds of vermin which multiply so fast in it, the owner will be greatly disappointed in his expectations.

When the insects are at their full growth, they are gathered and put into pots of earthen ware: but much attention is requisite to prevent them from getting out, as in that case great numbers of them would be lost; though there is no danger of it, where they are at liberty on the nopal leaves, those being their natural habitation, and where they enjoy a plenty of delicious food: for though they often remove from one leaf to another, they never quit the plant; nor is it uncommon to see the leaves entirely covered with them, especially when they are arrived at maturity. When they have been confined some time in these pots, they are killed and put in bags. The Indians have three different methods of killing these insects; one by hot water, another by fire, and a third by the rays of the sun: and to these are owing the several gradations of the colour, which in some is dark, and in others bright; but all require a certain degree of heat. Those therefore who use hot water are very careful to give it the requisite heat, and that the quantity of water be proportioned to the number of insects. The method of killing the creatures by fire is to put them on shovels into an oven moderately heated for that intention; the fine quality of the cochineal depending on its not being over dried at the time of killing the insects; and it must be owned, that among the several ways made use of to destroy this valuable creature, that of the rays of the sun seems to bid fairest for performing it in the most perfect manner.

Besides the precaution requisite in killing the cochineal, in order to preserve its quality, it is equally necessary to know when it is in a proper state for being

removed from the leaves of the nopal; but as experience only can teach the cultivator this necessary criterion, no fixed rule can be laid down. Accordingly, in those provinces where the cultivation of these insects is chiefly carried on, those gathered by Indians of one village differ from those gathered in another; and even those gathered by one person in the same village, are often different from those gathered by another; every individual adhering to his own method.

The cochineal-insect may, in some circumstances, be compared to the silk-worm, particularly in the manner of depositing its eggs. The insects destined for this purpose are taken at a proper time of their growth, and put into a box well closed, and lined with a coarse cloth that none of them be lost: and in this confinement they lay their eggs and die. The box is kept close shut till the time of placing the eggs on the nopal, when, if any motion is perceived, it is a sufficient indication that the animalcule has life, though the egg is so minute as hardly to be perceived; and this is the seed placed on the foliage of the nopal, and the quantity contained in the shell of a hen's egg is sufficient for covering a whole plant. It is remarkable that this insect does not, or at least in any visible manner, injure the plant, but extracts its nourishment from the most succulent juice, which it sucks by means of its proboscis through the fine teguments of the leaves.

The principal countries where the cochineal insects are bred, are Oaxaca, Tlascala, Chulula, Nueva Galicia, and Chiapa, in the kingdom of New Spain; and Hambato, Loja, and Tucuman in Peru: but it is only in Oaxaca that they are gathered in large quantities, and form a branch of commerce; the cultivation of these little creatures being there the chief employment of the Indians.

Though the cochineal belongs to the animal kingdom, of all others the most liable to corruption, yet it never spoils. Without any other care than merely that of keeping in a box, it has been preserved for ages. In drying, it loses about two-thirds of its weight. When dried, it is sorted into large entire grains, and small or broken ones: the first are called by the Spaniards *grana*, the latter *granilla*. In trade, four sorts are distinguished, *Mastique*, *Campechane*, *Tetrascale*, and *sylvestre*; of which the first is accounted the best, and the last the worst. The three first are named from the places where they are produced; the latter from its being found wild without any culture.

In medicine, cochineal has been strongly recommended as a sudorific, cardiac, and alexipharmac; but practitioners have never observed any considerable effects from it. Its principal consumption is among dyers. See the article DYEING.

4. The *coccus ilicis*, or that forming the kermes grains, inhabits the *quercus coccifera* of the southern parts of Europe. Mr Hellot of the French Academy of Sciences, in his Art of Dyeing, chap. 12. says it is found in the woods of Vauvert, Vendeman, and Narbonne; but more abundantly in Spain, towards Alicante and Valencia. It not only abounds in Valencia, but also in Murcia, Jaen, Cordova, Seville, Estremadura, la Mancha, Serranias de Cuenca, and other places.

Coccus.

Dillon's
Travels
through
Spain.

In Xixona and Tierra de Rellu, there is a district called *De la Grana*, where the people of Valencia first began to gather it, whose example was followed all over Spain. It has some years produced 30,000 dollars (5000l.) to the inhabitants of Xixona.

Both ancients and moderns seem to have had very confused notions concerning the origin and nature of the kermes; some considering it as a fruit, without a just knowledge of the tree which produced it; others taking it for an excrescence formed by the puncture of a particular fly, the same as the common gall observed upon oaks. Tournefort was of this number. Count Marfigli, and Dr Nisole a physician of Montpellier, made experiments and observations, with a view of further discoveries; but did not perfectly succeed. Two other physicians at Aix in Provence, Dr Emeric and Dr Garidel, applied themselves about the same time, and with greater success; having finally discovered that the kermes is in reality nothing else but the body of an insect transformed into a grain, berry, or husk, according to the course of nature.

The progress of this transformation must be considered at three different seasons. In the first stage, at the beginning of March, an animalcule, no larger than a grain of millet, scarce able to crawl, is perceived sticking to the branches of the tree, where it fixes itself, and soon becomes immovable; at this period it grows the most, appears to swell and thrive with the sustenance it draws in by degrees. This state of rest seems to have deceived the curious observer, it then resembling an excrescence of the bark; during this period of its growth, it appears to be covered with a down, extending over its whole frame like a net, and adhering to the bark: its figure is convex, not unlike a small shoe: in such parts as are not quite hidden by this soft garment, many bright specks are perceived of a gold colour, as well as stripes running across the body from one space to another. At the second stage, in April, its growth is completed; its shape is then round, and about the size of a pea: it has then acquired more strength, and its down is changed into dust, and seems to be nothing but a husk or a capsule, full of a reddish juice not unlike discoloured blood. Its third state is towards the end of May, a little sooner or later according to the warmth of the climate. The husk appears replete with small eggs, less than the seed of a poppy. These are properly ranged under the belly of the insect, progressively placed in the nest of down that covers its body, which it withdraws in proportion to the number of eggs; after this work is performed, it soon dies, though it still adheres to its position, rendering a further service to its progeny, and shielding them from the inclemency of the weather, or the hostile attacks of an enemy. In a good season they multiply exceedingly, having from 1800 to 2000 eggs, which produced the same number of animalcules. When observed with the microscope in July or August, we find, that what appeared as dust, are so many eggs or open capsules, as white as snow, out of each of which issues a gold-coloured animalcule, of the shape of a cockroach, with two horns, six feet, and a forked tail. In Languedoc and Provence the poor are employed to gather the kermes, the women letting their nails grow for that purpose, in order to pick them off with greater facility.

Coccus.

The custom of lopping off the boughs is very injudicious, as by this means they destroy the next year's harvest. Some women will gather two or three pounds a-day: the great point being to know the places where they are most likely to be found in any quantity, and to gather them early with the morning-dew, as the leaves are more pliable and tender at that time than after they have been dried and parched by the rays of the sun: strong dews will occasionally make them fall from the trees sooner than usual; when the proper season passes, they fall off of themselves, and become food for birds, particularly doves. Sometimes there will be a second production, which is commonly of a less size with a fainter tinge. The first is generally found adhering to the bark, as well as on the branches and stalks; the second is principally on the leaves, as the worms choose that part where the nutritious juice preserves itself the longest, is most abundant, and can be most easily devoured in the short time that remains of their existence, the bark being then drier and harder than the leaves.

Those who buy the kermes to send to foreign parts, spread it on linen; taking care to sprinkle it with vinegar, to kill the worms that are within, which produces a red dust, which in Spain is separated from the husk. Then they let it dry, passing it through a sieve, and make it up into bags. In the middle of each, its proportion of red dust, put in a little leather bag, also belongs to the buyer; and then it is ready for exportation, being always in demand on the African coast. The people of Hinojos, Bonares, Villalba, and other parts of the kingdom of Seville, dry it on mats in the sun, stirring it about, and separating the red dust, which is the finest part, and being mixed with vinegar goes by the name of *paslel*. The same is done with the husks; but these have but half the value of the dust. The kermes of Spain is preferred on the coast of Barbary, on account of its goodness. The people of Tunis mix it with that of Tetuan, for dyeing those scarlet caps so much used in the Levant. The Tunisians export every year above 150,000 dozen of these caps, which yields to the Dey a revenue of 150,000 hard dollars (33,750l.) *per annum* for duties; so that, exclusive of the uses and advantages of kermes in medicine, it appears to be a very valuable branch of commerce in Spain.

5. The *coccus lacca*, or gum-lac animal, is a native of the East Indies. The head and trunk form one uniform, oval, compressed, red body, of the shape and magnitude of a very small louse, consisting of twelve transverse rings. The back is carinate; the belly flat; the antennæ half the length of the body, filiform, truncated, and diverging, sending off two, often three, delicate, diverging hairs, longer than the antennæ: the mouth and eyes could not be seen with the naked eye. The tail is a little white point, sending off two horizontal hairs as long as the body. It has three pair of limbs, half the length of the insect.

This is its description in that state in which it falls forth from the womb of the parent in the months of November and December. They traverse the branches of the trees upon which they were produced for some time, and then fix themselves upon the succulent extremities of the young branches. By the middle of January they are all fixed in their proper situa-

Coccus. situations; they appear as plump as before, but show no other marks of life. The limbs, antennæ, and feet of the tail are no longer to be seen. Around their edges they are invironed with a spissid subpellucid liquid, which seems to glue them to the branch: it is the gradual accumulation of this liquid which forms a complete cell for each insect, and is what is called *gum lacca*. About the middle of March the cells are completely formed, and the insect is in appearance an oval, smooth, red-bag, without life, about the size of a small cucurbitular insect, emarginated at the obtuse end, full of a beautiful red liquid. In October and November we find about 20 or 30 oval eggs, or rather young grubs, within the red fluid of the mother. When this fluid is all expended, the young insects pierce a hole through the back of their mother, and walk off one by one, leaving their exuvie behind, which is that white membranous substance found in the empty cells of the stick lac.

The insects are the inhabitants of four trees: 1. *Ficus religiosa*, *Linnaei*; 2. *Ficus indica*, *Linnaei*; 3. *Plaso*, *Hortus Malabarici*; and 4. *Rhamnus jujuba*, *Linnaei*.

The insects generally fix themselves so close together, and in such numbers, that scarcely one in six can have room to complete her cell: the others die, and are eat up by various insects. The extreme branches appear as if they were covered with a red dust, and their sap is so much exhausted, that they wither and produce no fruit, the leaves drop off, or turn to a dirty black colour. These insects are transplanted by birds: if they perch upon these branches, they must carry off a number of the insects upon their feet to the next tree they rest upon. It is worth observing, that these fig-trees when wounded drop a milky juice, which instantly coagulates into a viscid rosey substance, which, hardened in the open air, is similar to the cell of the *coccus lacca*. The natives boil this milk with oils into a bird-lime, which will catch peacocks or the largest birds.

A red medicinal gum is procured by incision from the *plaso* tree, so similar to the *gum lacca*, that it may readily be taken for the same substance. Hence it is probable, that those insects have little trouble in animalizing the sap of these trees in the formation of their cells. The *gum lacca* is rarely seen upon the *rhamnus jujuba*; and it is inferior to what is found upon the other trees. The *gum lacca* of this country is principally found upon the uncultivated mountains on both sides the Ganges, where bountiful nature has produced it in such abundance, that was the consumption ten times greater the markets might be supplied by this minute insect. The only trouble in procuring the lac is in breaking down the branches, and carrying them to market. The present price in *Dacca* is about twelve shillings the hundred pounds weight, although it is brought from the distant country of *Affam*. The best lack is of a deep red colour. If it is pale, and pierced at top, the value diminishes, because the insects have left their cells, and consequently they can be of no use as a dye or colour, but probably they are better for varnishes.

This insect and its cell has gone under the various names of *gum lacca*, *lack*, *loc-tree*. In *Bengal*, *la*; and by the English it is distinguished into four kinds,

differently denominated: for which, and their several uses, see the article *LACCA*. Coccus

In the figure, *a* represents the insect at its birth; *b* ditto, big with young; both the natural size. *c* The embryo before birth inclosed in its membrane; *d* The *coccus*, with two hairs from each antenna; *e* Ditto, with three hairs from each antenna; these three figures are magnified.

6. *Coccus Polonicus*, an insect which may properly enough be called the *cochineal* of the northern part of the world. As the *cochineal* loves only the hot climates, this creature affects only the cold ones. It is collected for the use of dyers: but the crops of it are much smaller, more difficultly made, and the drug itself greatly inferior to the true *cochineal*. It is commonly known by the name of *coccus Polonicus*, or the *scarlet grain of Poland*. That country is indeed the place where it is gathered in the greatest abundance; but it is not the only one where it is found. It is to be met with in many of the northern countries; and possibly may be found in some of the more temperate ones, where it is not yet known; as it is very much hid by nature from the eyes of common observers. It is found affixed to the root of a plant, and usually to plants of that species from thence called *polygonum cocciferum*: though authors have informed us of the same berry, as it is often called, being found at the roots of the mouse-ear, rupture-wort, pimpernel, and pellitory of the wall; and that it is in no other than sandy places that it is found at the roots of those plants. Breynius, in 1731, printed at *Dantzick* a very curious account of this production, which proves it incontrovertibly to be an animal. Towards the end of June the *coccus* is in a fit state for being gathered. Every one of the creatures is then early of a spherical form, and of a fine violet colour. Some of them, however, are not larger than poppy seeds, and others of the size of a pepper corn; and each of them is lodged, either in part or entirely, in a sort of cup like that of an acorn. More than half the surface of the body of the animal is covered by this cup. The outside of the covering is rough, and of a blackish brown; but the inside is smooth, polished, and shining. On some plants they find only one or two of these, and on others more than forty; and they are sometimes placed near the origin of the stalks of the plants.

Breynius began his observations on the animals in this state, several of them being put into vessels of glass; and by the 24th of July, there was produced from every one of them a hexapod, or six legged worm, with two antennæ on its head. Several of these were kept a fortnight, and showed no inclination to eat any thing. They run about, however, very swiftly for some time; but then began to be more quiet, drew up their bodies shorter, and ceased to run about any longer. They were now of a purple colour; but in this state, though they did not walk about, they were subject to various contortions. At length, when they were become wholly motionless, their bodies became covered with a fine down: this was white, and formed them a perfect covering, which was sometimes of a spherical and sometimes of an irregular figure: it was always, however, very elegant; and the downy matter plainly enough transpired out of the animal's body. The

creatures

Coccus.

creatures remained in this state of rest, and covered with this down, for five or six days; but at the end of that time, every one of them laid more than 150 eggs. These eggs were deposited upon the paper on which the animals were placed, and were enveloped in some measure by a downy matter. When the creatures had laid all their eggs, they died; and about the 24th of August there came from every egg a small insect, which to the eye scarce seemed any other than a red point; it might, however, be observed very plainly to move about. These young animals lived about a month, wholly without sustenance. Mr Breynius was induced at first to believe, that these animals came to be in a state to produce perfect eggs, without any congress with the male; but farther observations convinced him of the error of this opinion. He saw afterwards a sort of very small flies with two white wings bordered with red, produced from several of the cocci. These flies are plainly of the same kind with the male gall-insects.

It has before been observed, that these cocci differ in size. The flies are produced by the small ones not bigger than a poppy seed; the others produce the worms before described: and one observation of Mr Breynius's affords a plain proof that these flies are the male insects of the species; since all those of the females, which had been a day or two accompanied by those flies, quickly covered themselves with down and began to lay their eggs; whereas those which had not this commerce with the flies remained in the same state, or else got only a very thin and slight covering of down, and never laid any eggs. The manner of this creature's life, however, from its being hatched, to its being found in the shape of a berry at the roots of the plants, is yet unknown: and how they assume the shape of a ball lodged in a cup, must require a nice observation to discover.

The proper time for gathering this insect, as we have already observed, is about the end of June, when it is quite full of purple juice. Those who gather it have a hollow spade with a short handle; then, taking hold of the plant with one hand, they raise it out of the ground with the tool held in the other; after which they very quickly and dexterously detach the insects, and replace the plant in the ground, where it again takes root. The coccus is then separated from the earth by means of a sieve; and in order to prevent them from turning into worms, they sprinkle them with very cold water or vinegar. Lastly, they are killed by exposure to the sun, or keeping them for some time in a warm place; but this must be done with caution, as too hasty drying would spoil the colour. Sometimes they separate the insects from the vesicles with their fingers, and form them into balls; but by this operation the price is greatly increased.

We are informed by Bernard de Bemith, from whom this account is taken, that the harvest of coccus was farmed out to the Jews by some Polish lords, who had possessions in the Ukraine; that it was used by them, as well as the Turks and Armenians, for dyeing not only wool and silk, but the tails and manes of their horses; that by its means the Turkish women dyed the tips of their fingers of a beautiful carnation; and that it was formerly used by the Dutch along with an equal quantity of cochineal, the coccus being pur-

chased at a very dear rate; that beautiful paints may be prepared from this insect and pounded chalk, &c. All this, however, M. Macquer supposes to have been exaggerated, as he never could produce with it any other than lilach, flesh-colour, or crimson; and he found it, moreover, vastly more expensive than cochineal, as not yielding one-fifth part of the colour. Hence this drug is almost entirely fallen into disuse, being scarce known in any of the European cities remarkable for having good dyers.

COCYGAËUS MUSCULUS. See ANATOMY, *Table of the Muscles.*

COCYX, or COCYGIS OS. See ANATOMY, n° 35.

COCHIN, a Dutch settlement on the coast of Malabar, in N. Lat. 9. 58. E. Long. 75. 58.—The town is not unpleasant, though it falls far short of their settlement at Columbo in the island of Ceylon. The fortification is irregular, but strong enough to resist any of the Indian powers, and has 40 or 50 cannon facing the sea. The people in this town and the country adjacent are subject to a strange disorder of the legs called *Cochin* or *elephant legs*, in which the swelled limb is sometimes of such an enormous bulk as to have greatly the appearance both in shape and size of the leg of an elephant. According to Mr Ives, this disorder seems to be merely an œdematous swelling, occasioned by an impoverished state of the blood and juices. The persons afflicted with this distemper very seldom apply to European surgeons, and thus are rarely if ever cured. Indeed, our author observes, that their application would probably be of little avail, as the only thing that could be prescribed would be an alteration from the poorest to the most cordial and nutritious diet; and the Indians are so invincibly wedded to their own customs, that they would sooner die than break through them. Of this he says there were several instances in their long passage to Bengal, during which some of the Sepoys perished for want of food rather than save themselves by partaking of the ship's provisions after their own had been expended. Most of those afflicted with the disorder we speak of, are unable to call any assistance, being the very poorest of the people, who live entirely upon a kind of fish called *Sardinias*, without being able to purchase even the smallest quantity of rice to eat along with it; their drink is also mere water, unless they sometimes procure a draught of the simple unfermented juice called *toddy*. Cochin is the principal place from whence the Dutch import their pepper into Europe.

COCHIN-CHINA, a kingdom of Asia, bounded on the north by Tonquin; on the east, by the sea of China; on the south, by the Indian ocean; and on the west, by Cambodia, and a ridge of mountains inhabited by a savage people called *Kemois*, who live independent of any government. Little of the history of this kingdom is known. M. le Poivre, a French traveller, informs us, that about half a century before the French first arrived in these distant regions, a prince of Tonquin, as he fled from his sovereign, by whom he was pursued as a rebel, had with his soldiers and adherents crossed the river, which serves as a barrier between Tonquin and Cochin-China. The fugitives, who were warlike and civilized men, soon expelled the scattered inhabitants, who wandered about without any so-

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ciety or form of government, and founded a new kingdom, which soon grew rich and populous. During the reigns of the first six kings, no nation could be happier than the Cochin-Chinese. Their monarchs governed them as a father does his family, establishing no laws but those of nature, to which they themselves were the first to pay obedience. They honoured and encouraged agriculture, as the most useful employment of mankind; and required from their subjects only a small annual free-gift to defray the expence of their defensive war against the Tonquinese, who were their enemies. This imposition was regulated, by way of poll-tax, with the greatest equity. Every man, able to till the ground, paid into the prince a small sum proportioned to the strength of his constitution, and the vigour of his arm; and nothing more.

Cochin-China continued happy under these princes for more than a century; but the discovery of gold-mines put a stop to the above mild regulations. Luxury immediately took place. The prince began to despise the simple habitation of his ancestors, and caused a superb palace to be built a league in circumference, surrounded with a wall of brick in the model of that of Pekin, and defended by 1600 pieces of cannon. Not content with this, he would needs have a winter palace, an autumn palace, and a summer palace. The old taxes were by no means sufficient to defray these expences; new ones were devised; and oppression and tyranny every where took place. His courtiers, to flatter their prince, gave him the title of the *king of heaven*, which he still continues to assume. When speaking of his subjects, he styles them his *children*, but by no means behaves as if he was their father: for our author informs us, that he has seen whole villages newly abandoned by their inhabitants, who were harassed with toil and insupportable exactions; the necessary consequence of which was, that their lands returned to their former uncultivated state.

M. le Poivre represents the Cochin-Chinese as gentle, hospitable, frugal, and industrious. There is not a beggar in the country; and robbery and murder are absolutely unknown. A stranger may wander over the kingdom from one end to the other (the capital excepted) without meeting with the slightest insult. He will be every where received with the most eager curiosity, but at the same time with the greatest benevolence. A Cochin-Chinese traveller, who has not money sufficient to defray his expences at an inn, enters the first house of the town or village he arrives at, and waiting the hour of dinner, takes part with the family, and goes away when he thinks proper, without speaking a word, or any person's putting to him a single question.

The country of Cochin-China is much of the same temperature with that of Tonquin; though rather milder as lying nearer the sea. Like Tonquin, it is annually overflowed, and consequently fruitful in rice, which requires no other manure than the mud left by the inundations. They have sugar-canes, and the same kinds of fruits common to other parts of India. The country produces no grapes, and therefore they drink a liquor brewed from rice. They have vast woods of mulberry-trees, which run up as fast as our hemp. Their silk is stronger than that of China, but

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not so fine. They have the best timber in the world, particularly a sort which abounds in the mountains, and is called the *incorruptible tree*; because it never rots under earth or water, and is so solid that it serves for anchors. There are two kinds, black and red. The trees are very tall, straight, and so big that two men can scarce fathom them. They have also on the mountains of the Kemois a tree of the most fragrant scent, which is supposed to be the same with *lignum aloes*. This, being reckoned the best product of the country, is engrossed by the king, and is sold from five to 16 ducats *per* pound. It is highly valued both in China and Japan, where the logs of it are sold for 200 ducats a pound, to make pillows for the king and nobility; and among those Indians which continue to burn their dead, great quantities of it are used in the funeral piles. The young trees called *aquila*, or eagle-wood, are every one's property, which makes the old ones called *calamba* so scarce and dear. They have oak, and large pines, for the building of ships; so that this country is of the same use to China that Norway is to Britain. In general, they have the same kind of trees and plants that are to be met with in Tonquin. They have mines of gold, as well as diamonds; but the last they do not value so highly as pearl. They also esteem their coral and amber very much. In all the provinces there are great granaries filled with rice, in some of which that grain is kept upwards of 30 years. One of the greatest rarities of these parts, especially in grand entertainments, is a ragout made of the eatable birds nests, which some say are found only in Cochin-China, and others in four islands that lie south of its coast. See BIRDS-NESTS.

The merchants of Cambodia, Tonquin, China, Macao, Manila, Japan, and Malacca, trade to Cochin-China with plate, which they exchange for the commodities of the country. The Portuguese are the most favoured here of any Europeans. The Cochin-Chinese themselves, not being inclined to travel, seldom sail out of sight of their own shore, but purchase many trifles from foreigners at great rates, particularly combs, needles, bracelets, glass pendants, &c. They are very fond of our hats, caps, girdles, shirts, and other clothes; and, above all, set a great value on coral. The country is said to have 700 miles of coast, with many large inlets of the sea, and above 60 convenient landing places; which, however, according to Captain Hamilton, are but seldom visited by strangers.

The people of this country have a great affinity with those of Tonquin, with whom they have a common origin, and from whom they differ very little in their manner of living, as well as their manners and customs, all of which they have in a great measure borrowed from the Chinese. The principal exports of the country are silk, sugar, ebony, and calamba-wood; gold in dust or in bars, which is sold for only ten times its weight in silver; and copper and porcelain brought from China and Japan. From this country also are exported the birds-nests esteemed such a delicacy at the table. They are found in four islands situated near the coasts of Cochin-China, to the eastward of which are five other smaller ones, where are found prodigious numbers of turtles, the flesh of which is so delicate that the Tonquinese and people of Cochin-China frequently fight desperate battles,

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in order to take them from one another.—The commodities which sell most readily in this country are, salt-petre, sulphur, lead, fine cloths, and barred or flowered chintz. Pearls, amber, and coral, were formerly in great request, but at present only the two last are saleable; and even these will not answer unless the beads of coral be round, well polished, and of a beautiful red colour; the amber must also be extremely clear, the beads of an equal size, and not larger than an hazel nut.

The only money current in Cochin-China is that of Japan, which is paid and received by weight. The money of the country is of copper, and as large as our counters; of a round figure, and having an hole in the middle by which the pieces may be strung like beads. Three hundred of these are put on one side, and as many on the other, which in Cochin-China pass for a thousand; because in 600 are found ten times 60, which make a century among almost all the people of the east. There is, however, scarce any country in which merchants are more apt to be deceived with regard to the value of money than Cochin-China; owing to the pieces being unequal in figure and quality, and the difficulty of determining their value, which is regulated only by a few characters stamped upon them. The dealers must therefore be at pains to have honest and skilful people to ascertain the value of the pieces they receive; otherwise they run a great risk of being deceived in their value, as the Cochin-Chinese make a great merit of being able to cheat an European.

European merchants complain, according to M. Grosier, unjustly of the demands made in Cochin-China for entrance, clearance, and anchorage. The duties indeed are very trifling, amounting only, even those of the custom-house, to 4 per cent.; but nothing can be removed from a ship which arrives there until she has first been inspected, when the custom-house officers unload her, weigh and count the smallest pieces, and generally take what they look upon to be most valuable, in order to send it to the king. The monarch takes what he thinks proper, and returns the value; but the grandees are said to keep part of the goods also, without paying any thing for them. Thus the ordinary goods, which, had they been accompanied with the more valuable part of the cargo, would have found a ready market, can now scarcely be disposed of; though our author is of opinion, that the matter is not altogether without remedy. When the Dutch sent to this country, vessels loaded with cloths, lead, and saltpetre, their cargoes were suffered to remain entire, because they had taken the precaution to pay every year a certain sum for each vessel that entered. Other nations, by endeavouring to avoid the payment of this duty, entirely destroyed their commerce: the people of Cochin-China, however, for some years past, have been much more moderate in their demands; and whatever their exactions may be, they are far less exorbitant than those of the Tonquinese.

M. Grosier observes, that a false report has gained ground in Europe, that when a trading vessel happens to run a-ground in Cochin-China, or to be driven into any of its harbours by stress of weather, the king seizes the cargo if the rudder be broken. He assures us, however, that, so far from this being the case, a ves-

sel in distress is much safer on the coasts of Cochin-China than almost any where else. Barks are immediately sent to the relief of the crew, and people employed to drag the sea with nets in order to recover the goods that are lost; and, in short, neither labour nor expences are spared to put the ship in the best condition possible. Only two things can hurt the trade of foreigners at Cochin-China, one of which may be easily avoided. This regards the clearing out of vessels. Thus, while the master is waiting on the evening before his departure, or on the day fixed for sailing, in order to receive his dispatches, it often happens that he loses his voyage, which may prove the ruin of a trader. For this reason, care must be taken to solicit a clearance a month before; by which means one is always certain of obtaining it, and departing on the day appointed. The other difficulty is occasioned by the necessity of selling goods on credit, which are seldom paid at the stipulated time. This, however, is contrary to the inclination of the prince; for every merchant who can convey to him an account of these unjust delays, is sure to be paid, and sometimes even with interest.

COCHINEAL, or COCHINEEL, a drug used by the dyers, &c. for giving red colours, especially crimsons and scarlets, and for making carmine; and likewise in medicine as a cardiac, cordial, sudorific, alexipharmac, and febrifuge.

The cochineal, in the state in which it is brought to us, is in small bodies of an irregular figure, usually convex, and ridged and furrowed on one side, and concave on the other. The colour of the best is a purplish grey, powdered over with a sort of white dust. All that the world knew of it for a long time was, that it was gathered from certain plants in Mexico; and therefore it was naturally supposed to be a seed, till in the year 1692 Father Plumier gave Pomet an account of its being an animal. And this, though then disregarded, has been confirmed by subsequent observations. Indeed, to determine the point, we have now the means in our own hands, even in this part of the world.—We need only moisten and soak in water, or in vinegar, a number of cochineals till they are swelled and distended, to know that every one is the more or less perfect body of an insect; the most imperfect and mutilated specimens always show the rings of the body; and from observing others, it will be easy to find the number and disposition of the legs, parts, or even whole ones, being left on several, and often complete pairs. In this way the legs, antennæ, and proboscis, may be discovered. See Coccus above.

M. Macquer observes, that the cochineal of Sylvestre is gathered in the woods of Old and New Mexico. The insect lives, grows, and multiplies on the uncultivated opuntias, which grow there in great abundance. It is there exposed to the inclemencies of the weather, and dies naturally. The colour is more durable than that of the common cochineal, but less bright: but there is no advantage in using it; for, though cheaper, a greater quantity is requisite.

COCHLEA, the shell snail, in zoology. See HELIX.

COCHLEA, in Anatomy. See ANATOMY, p. 765. col. 1.

COCHLEARIA,

Cochineal,
Cochlea.

Cochlearia
Cocintum.

COCHLEARIA, SCURVY-GRASS: A genus of the filiculosa order, belonging to the tetradynamia class of plants; and in the natural method ranking under the 39th order, *Siliquosa*. The filicula is emarginated, turgid, and scabrous; with the valves gibbous and obtuse. There are six species; the most remarkable of which are, 1. The angelica, or garden scurvy-grass, grows naturally on the sea-shore, in the north of England and in Holland: but is cultivated for use in the gardens near London. It hath a fibrous root, from which arise many round succulent leaves, which are hollowed like a spoon; the stalks rise from six inches to a foot high: these are brittle, and garnished with leaves which are oblong and sinuated. The flowers are produced in clusters at the end of the branches, consisting of four small white petals, which are placed in the form of a cross; and are succeeded by short, roundish, swelling, seed-vessels, having two cells divided by a thin partition. In each of these are lodged four or five roundish seeds. 2. The armoracia, or horse-radish, is so well known as to need no description.

The first is propagated by seeds, which are to be sown in July, in a moist spot of ground: and when the plants are come up, they should be thinned so as to be left at about six inches distance each way. The plants that are taken out may be transplanted into other borders. In the spring these plants will be fit for use; those that are left will run up to seed in May, and perfect their seeds in June. If the seeds are sown in the spring, they seldom grow well. The horse-radish is propagated by cuttings or buds from the sides of the old roots. The best season for this work is in October or February; the former for dry lands, the latter for moist.

Uses. Scurvy-grass is a pungent stimulating medicine; capable of dissolving viscid juices, opening obstructions of the viscera and the more distant glands, and promoting the more fluid secretions. It is particularly celebrated in scurvy, and is the principal herb employed in these disorders in the northern countries. Horse-radish root has a quick pungent smell, and a penetrating acrid taste; it nevertheless contains in certain vessels a sweet juice, which sometimes exudes on the surface. By drying it loses all its acrimony, becoming first sweetish, and then almost insipid: if kept in a cool place in sand, it retains its qualities for a considerable time. The medical effects of it are to stimulate the solids, attenuate the juices, and promote the fluid secretions: it seems to extend its action through the whole habit, and to affect the minutest glands. It has frequently done service in some kinds of scurvy, and other chronic disorders proceeding from a viscosity of the juices or obstructions of the excretory ducts. Sydenham recommends it likewise in dropries, particularly those which follow intermittent fevers. Both water and rectified spirit extract the virtues of this root by infusion, and elevate them in distillations: along with the aqueous fluid an essential oil rises, possessing the whole taste and pungency of the horse-radish.

COCHLITES, in natural history, an appellation given to the petrified shells of the cochleæ or snails.

COCINTUM (anc. geog.), a promontory of the Bruttii, reckoned the longest in Italy: and which

Holstenius and Vossius have restored to Ovid, reading *Cocintia* for *Ceurania*, Metam. XV. v. 704. *Cocintum*, also a town, 22 miles to the south of Scylaceum, almost on the spot where now *Stilo* stands; from which the opposite promontory *Cocintum* is commonly called *Capo de Stilo*.

COCK, in zoology, the English name of the males of gallinaceous birds, but more especially used for the common dunghill cock. See PHASIANUS.

Black Cock.

Cock of the Wood.

Cock-Chaffer. See SCARABÆUS.

Cock-Paddle, Lump-fish or Sea-owl. See CYCLOPTERUS.

Cock-Pit, a sort of theatre upon which game cocks fight.

It must appear astonishing to every reflecting mind, that a mode of diversion so cruel and inhuman as that of cock-fighting should so generally prevail, that not only the ancients, barbarians, Greeks, and Romans, should have adopted it: but that a practice so savage and heathenish should be continued by Christians of all sorts, and even pursued in these better and more enlightened times.

The ancient Greeks and Romans, as is well known, were wont to call all the nations in the world barbarians; yet certainly, if we consider the many instances of cruelty practised among them, there was very little reason for the distinction. Human sacrifices were common both to them and the barbarians; and with them the exposing of infants, the combats of men with wild beasts, and of men with men in the gladiatorial scenes, were spectacles of delight and festivity.

The islanders of Delos, it seems, were great lovers of cock-fighting; and Tanagra a city in Bœotia, the isle of Rhodes, Chalcis in Eubœa, and the country of Media, were famous for their generous and magnanimous race of chickens. The kingdom of Persia was probably included in the last, from whence this kind of poultry was first brought into Greece; and if one may judge of the rest from the fowls of Rhodes and Media, the excellency of the broods at that time consisted in their weight and largeness (as the fowls of those countries were heavy and bulky), and of the nature of what our sportsmen call *shakebags* or *turnpokes*. The Greeks, moreover, had some method of preparing the birds for battle, by feeding; as may be collected from Columella.

It should seem, that at first cock-fighting was partly a religious and partly a political institution at Athens; and was there continued for the purpose of improving the seeds of valour in the minds of their youth; but was afterwards abused and perverted both here and in the other parts of Greece to a common pastime, without any moral, political, or religious intention, and as it is now followed and practised among us.

At Rome, as the Romans were prone to imitate the Greeks, we may expect to find them following their example in this mode of diversion, and in the worst way, viz. without any good or laudable motives; since, when they took and brought it to Rome, the Greeks had forgotten every thing that was commendable in it, and had already perverted it to a low and unmeaning sport. Signior Hyam thinks the Romans borrowed the pastime from Dardanus in Asia; but there is little

Cock
Cock-Pit.

Cock-pit. reason for making them go so far from it, when it was so generally followed in Greece, whose customs the Romans were addicted to borrow and imitate. However, it is probable, they did not adopt this opinion very early. It may be gathered from Columella, that the Romans did not use the sport in his time. This author styles cock-fighting a *Grecian diversion*; and speaks of it in terms of ignominy, as an expensive amusement, unbecoming the frugal householder, and often attended with the ruin of the parties that followed it. The words are remarkable. "Nos enim censemus instituere vectigal industrii patris familias, non rixosarum avium lanistæ, cujus plerumque totum patrimonium pignus aleæ, victor gallinaceus pycetes abstulit." When he describes, as we think, the manner, not of the Romans, but of the Greeks, who had in his time converted the diversion of cock-fighting into a species of gaming, and even to the total ruin of their families, as happens but too often in England at this day. The Romans, however, at last give into the custom, tho' not till the decline of the empire. The first cause of contention between the two brothers Bassianus and Geta, sons of the emperor Septimus Severus, happened, according to Herodian, in their youth, about the fighting of their cocks: and if the battling between these two princes was the first instance of it, probably they had seen and learned it in Greece, whether they had often accompanied the emperor their father.

It is observable, that cocks and quails pitted for the purpose of engaging one another, a *outrance*, or to the last gasp, for diversion, are frequently compared, and with much propriety, to gladiators. Hence Pliny's expression, *Gallorum—ceu gladiatorum*; and that of Columella, *rixosarum avium lanistæ*; *lanistæ* being the proper term for the master of the gladiators. Consequently one would expect, that when the bloody scenes of the amphitheatre were discarded, as they were soon after the Christian religion became the establishment of the empire, the wanton shedding of mens blood in sport, being of too cruel and savage a nature to be patronised and encouraged in an institution so harmless and innocent as the Christian was, one might justly expect that the *ορτυγομαχία* and the *αλεκτρομαχία* would have ceased of course. The fathers of the church are continually inveighing against the spectacles of the arena, and upbraiding their adversaries with them. These indeed were more unnatural and shocking than a main of cocks; but this, however, had a tendency towards infusing the like ferocity and implacability in the breasts and dispositions of men.

Besides, this mode of diversion has been in fact the bane and destruction of thousands here, as well as those of *lanistæ avium*, "cock-feeders," mentioned by Columella, whose patrimonial fortunes were totally dissipated and destroyed by it.

The cock is not only an useful animal, but stately in his figure, and magnificent in his plumage. "*Imperitant suo generi*, says Pliny, *et regnum*, in quacunque sunt domo, *exercent*." Aristophanes compares him to the king of Persia; most authors also take notice of the "*spectatissimum insigne, ferratum, quod eorum verticem regia corona modo exornat*." His tenderness towards his brood is such, that, contrary to the custom of many other males, he will scratch and provide for

them with an assiduity almost equal to that of the hen; **Cock-Pit.** and his generosity is so great, that, on finding a hoard of meat, he will chuckle the hens together, and without touching one bit himself will relinquish the whole of it to them. He was called *the bird* *κατ' ἐξοχὴν* by many of the ancients; he was highly esteemed in some countries, and in others was even held sacred, inso-much that one cannot but regret that a creature so useful and noble, should, by a strange fatality, be so enormously abused by us. It is true, our *αλεκτρομαχία*, or the massacre of Shrove Tuesday, is now in a declining way; and, in a few years, it is to be hoped will be totally disused: but the cock-pit still continues a reproach to the humanity of Englishmen, and to their religion; the purest, the tenderest, and most compassionate, of all others, not excepting even the Brachmannic.

It is unknown when the pitched battle first entered England: but it was probably brought thither by the Romans. The bird was here before Cæsar's arrival, but no notice of his fighting occurs earlier than the time of William Fitz-Stephen, who wrote the life of archbishop Becket, some time in the reign of Henry II. and describes the cocking as a sport of school-boys on Shrove Tuesday. From this time at least the diversion, however absurd, and even impious, was continued amongst us. It was followed, though disapproved and prohibited, 39 Edward III.; also in the reign of Henry VIII.: and A. D. 1569. It has by some been called a *royal diversion*; and, as every one knows, the cock-pit at Whitehall was erected by a crowned head, for the more magnificent celebration of it. There was another pit in Drury-lane, and another in Javin-street. It was prohibited, however, by one of Oliver's acts, March 31. 1664. What aggravates the reproach and disgrace upon Englishmen, are those species of fighting which are called the *battle-royal* and the *Welsh-main*, known no where in the world but there; neither in China, nor in Persia, nor in Malacca, nor among the savage tribes in America. These are scenes so bloody as almost to be too shocking to relate; and yet, as many may not be acquainted with the horrible nature of them, it may be proper for the excitement of our aversion and detestation to describe them in a few words. In the former, an unlimited number of fowls are pitted, and when they have slaughtered one another for the diversion (*Dii boni!*) of the otherwise generous and humane Englishman, the single surviving bird is to be esteemed the victor, and carries away the prize. The Welsh-main consists, we will suppose of 16 pair of cocks; of these, the 16 conquerors are pitted a second time: the 8 conquerors of these are pitted a third time; the 4 conquerors the fourth time; and lastly, the two conquerors of these are pitted the fifth time: so that (incredible barbarity!) 31 cocks are sure to be most inhumanely murdered for the sport and pleasure, the noise and nonsense, the profane cursing and swearing, of those who have the effrontery to call themselves, with all these bloody doings, and with all this impiety about them, *Christians*; nay, what with many is a superior and distinct character, men of benevolence and morality. But let the morality and benevolence of such be appreciated from the following instance recorded as authentic in the obituary of the Gentleman's Magazine for April 1789. "Died, April

Cock-Pit, Cockburne. April 4. at Tottenham, John Ardefoif, Esq; a young man of large fortune, and in the splendor of his carriages and horses rivalled by few country gentlemen. His table was that of hospitality, where it may be said he sacrificed too much to conviviality; but if he had his foibles, he had his merits also that far outweighed them. Mr Ardefoif was very fond of cock-fighting; and had a favourite cock upon which he had won many profitable matches. The last bet he laid upon this cock he lost; which so enraged him, that he had the bird tied to a spit and roasted alive before a large fire. The screams of the miserable animal were so affecting, that some gentlemen who were present attempted to interfere; which so enraged Mr Ardefoif, that he seized a poker, and with the most furious vehemence declared, that he would kill the first man who interposed: but, in the midst of his passionate asseverations, he fell down dead upon the spot. Such, we are assured, were the circumstances which attended the death of this great pillar of humanity."

COCK-PIT, of a ship of war, the apartment of the surgeon and his mates; being the place where the wounded men are dressed in time of battle, or otherwise. It is situated under the lower deck.

COCKBURN (Mrs Catharine), a most accomplished lady and celebrated writer, was the daughter of Captain David Trotter, a native of Scotland, and a sea-commander in the reign of King Charles II. She was born in London, August 16. 1679, and baptized in the Protestant church, according to which she was bred up. She gave early marks of her genius; and learned to write, and also made herself mistress of the French language, by her own application and diligence, without any instructor; but she had some assistance in the study of the Latin grammar and logic, of which latter she drew up an abstract for her own use. The most serious and important subjects, and especially religion, soon engaged her attention.—But notwithstanding her education, her intimacy with several families of distinction of the Romish persuasion, exposed her, while very young, to impressions in favour of that church; which not being removed by her conferences with some eminent and learned members of the church of England, she embraced the Romish communion, in which she continued till the year 1707. In 1695, she produced a tragedy called *Agnes de Castro*, which was acted at the theatre-royal when she was only in her 17th year. The reputation of this performance, and the verses which she addressed to Mr Congreve upon his Mourning Bride in 1697, were probably the foundation of her acquaintance with that celebrated writer. Her second tragedy, *Fatal Friendship*, was acted in 1698, at the new theatre in Lincoln's Inn-Fields. This tragedy met with great applause, and is still thought the most perfect of her dramatic performances. Her dramatic talents not being confined to tragedy, she brought upon the stage, in 1701, a comedy called *Love at a loss*, or *Most votes carry it*. In the same year she gave the public her third tragedy, entitled the *Unhappy Penitent*, acted at the theatre-royal in Drury-lane. But poetry and dramatic writing did not so far engross the thoughts of our author but that she sometimes turned them to subjects of a very different nature; and distinguished herself in an extraordinary manner in defence of Mr

Locke's writings, a female metaphysician being a remarkable phenomenon in the republic of letters.

She returned to the exercise of her dramatic genius in 1703, and fixed upon the revolution of Sweden, under Gustavus Erickson, for the subject of a tragedy. This tragedy was acted in 1706, at the queen's theatre in the Hay-Market. In 1707, her doubts concerning the Romish religion, which she had so many years professed, having led her to a thorough examination of the grounds of it, by consulting the best books on both sides of the question, and advising with men of the best judgment, the result was a conviction of the fallaciousness of the pretensions of that church, and a return to that of England, to which she adhered during the remainder of her life. In 1708, she was married to the Rev. Mr Cockburn, then curate of St Dunstan's in Fleet-street, but he afterwards obtained the living of Long-Horsely, near Morpeth in Northumberland. He was a man of considerable abilities; and, among several other things, wrote an account of the Mosiac Deluge, which was much approved by the learned.

Mrs Cockburn's remarks upon some writers in the controversy concerning the foundation of moral duty and moral obligation, were introduced to the world in August 1743, in the *Literary Journey*, intitled *The History of the Works of the Learned*. The strength, clearness, and vivacity shown in her remarks upon the most abstract and perplexed questions, immediately raised the curiosity of all good judges about the concealed writer; and their admiration was greatly increased when her sex and advanced age were known. Dr Rutherford's *Essay on the Nature and Obligations of Virtue*, published in May 1744, soon engaged her thoughts; and notwithstanding the asthmatic disorder which had seized her many years before, and now left her small intervals of ease, she applied herself to the confutation of that elaborate discourse, and finished it with a spirit, elegance, and perspicuity equal, if not superior, to all her former writings.

The loss of her husband in 1748, in the 71st year of his age, was a severe shock to her; and she did not long survive him, dying on the 11th of May 1749, in her 71st year, after having long supported a painful disorder with a resignation to the Divine will, which had been the governing principle of her whole life, and her support under the various trials of it.

Her works are collected into two large volumes 8vo., by Dr Birch; who has prefixed to them an account of her Life and Writings.

COCKERMOUTH, a town of Cumberland in England, situated in W. Long. 3. 12. N. Lat. 54. 35. It is a large town irregularly built, with broad streets. It is washed by the Derwent on the western side; divided in two by the Cocker; and the parts are connected by a stone-bridge of one single arch. The number of inhabitants is between three and four thousand: the manufactures are shalloons, worsted stockings, and hats: the last exported from Glasgow to the West Indies. It is a borough-town, and the right of voting is vested by burges tenure in certain houses; this is also the town where the county elections are made.—Here is a castle seated on an artificial mount on a bank above the Derwent. It has a square building, and strengthened with several square towers: on each side:

Cockburne, Cocker-mouth.

Cocket.
Cockle.

side of the inner gate are two deep dungeons capable of holding 50 persons in either; they are vaulted at top, and have only a small opening in order to lower through it the unhappy prisoners into this dire prison; and on the outside of each is a narrow slit with a slope from it, down which were shot the provisions allotted for the wretched inhabitants. This castle was founded by Waldof, first lord of Allerdale, and son of Gospatrick earl of Northumberland, cotemporary with William the Conqueror. Waldof resided first at Papcastle, which he afterwards demolished; and with the materials built that at Cockermouth, where he and his family long resided; but several arms over the gateway, which Camden says are those of the *Mulsons*, *Humfravilles*, *Lucies*, and *Piercies*, evince it to have belonged in later times to those families. It appears that it was first granted by Edward II. to Anthony de Lucie, son of Thomas de Multon, who had assumed that name, because his mother was daughter and co-heiress to Richard de Lucie; and afterwards, by marriages, this castle and its honours descended to the Humfravilles, and finally to the Percies. In 1658, it was garrisoned for the king; and being besieged and taken by the rebels, was burnt, and never afterwards repaired.—Cockermouth is now in the possession of the Lowther family, who have here a great property in coal-works. The town sends two members to parliament.

COCKET, is a seal belonging to the king's custom-house, or rather a scroll of parchment sealed and delivered by the officers of the customs to merchants, as a warrant that their merchandises are customed.

It is also used for the office where goods transported were first entered, and paid their custom, and had a cocket or certificate of discharge.

COCKLE, in ichthyology. See CARDIUM.

COCKLE, or SHIRLE, in mineralogy, a species of stones of the garnet kind, belonging to the siliceous class. It is called *Schoerlus* by Bergman, *Lapis corneus crystallizatus* by Wallerius, and *Stannum crystallis columnaribus* by Linnæus. It is hard and heavy, shooting into crystals of a prismatic figure, principally of a black or green colour. The name *cockle* for these kinds of stones is an old Cornish word; but is sometimes also applied to very different substances. The term *shirl* is adopted from the Germans. The English mineral name of *call* has also been used by some authors as synonymous with *cockle*, and these are even confounded together at the mines; but the *call*, definitively speaking, is the same with the substance called *wolfram* by the Germans.

The specific gravity of these stones is between 3000 and 3400, though always in proportion to their different solidities. They crack in the fire, and are very difficult to be fused; resisting both microcosmic salt and mineral alkali. They cannot totally be dissolved in aqua fortis; but the dissolved part is precipitated in a gelatinous form on the addition of an alkali. On a chemical analysis they are found to contain siliceous earth, argil, calcareous earth, and iron; which last is found in a much greater quantity when they are opaque than when transparent. According to Bergman, some contain 55 parts of siliceous earth, 39 of argillaceous, and six of pure calcareous earth; but some contain ten or twelve of magnesia. In Britain they

are chiefly found in Cornwall, about the tin mines, and some fine crystallized kinds have been brought from Scotland. The varieties are,

1. The *schoerlus martialis*, or cockle mixed with iron. It is of a green colour, and found in most of the Swedish iron mines. It is coarse, and without any determinate figure.

2. The *spatofus*, or sparry cockle, is found in some places of a deep green colour; whence authors have called it the mother of emeralds. Its specific character is, that it always breaks in a cubic or rhomboidal form. In some parts of Sweden it is found of a pale green, white, or black colour, and of a brown colour in Westmoreland in England. It frequently occurs in the scaly lime-stones, and its colour changes from a deep green to white, in proportion as it contains more or less iron.

3. Fibrous cockle resembles threads of glass. These are either parallel, or like rays from a centre, in which last case it is called *starred cockle*. Its colours are black, green, white, blackish green, and light green; all which are to be met with in Sweden. In Westmanland it is found along with a steel-grained lead ore; and here the whole is called *gran-ris-malm*, or pine-ore, from its resemblance to the branches of that tree. Cronstedt observes, that the structure of this substance has caused it to be sometimes confounded with the asbestos, and that to this species belong most of the substances called *imperfect asbesti*. The striated cockle, compared with the asbesti, is of a shining and angular surface, though this sometimes requires the aid of a magnifying glass to discover it; always somewhat transparent; and is pretty easily vitrified before the blow-pipe, without being consumed as the pure asbesti seem to be.

4. Crystallised cockle is found of black, deep-green, light green, and reddish-brown in Sweden, and some other European countries. Near Basil in Switzerland is found, though very rarely, a stone called *tauffstein*, belonging to this variety. It is of a reddish brown colour, and consists of two hexagonal crystals of cockle grown together in the form of a cross, which is worn by the Roman Catholics as an amulet, and called by them *lapis crucifer*, or the cross-stone. This form, however, is not peculiar to the cockle, for both Werner and Bergman mention crystals of mountain-crystal joined together in the same manner.

This variety was lately found by M. Fichtel on the Carpathian mountains, crystallised in prisms, and embodied in limestone. It effervesces slightly with acids, and contains 61.6 of siliceous earth, 21.6 of calcareous earth, 6.6 of argil, 5 of magnesia, 1.6 of iron, and three of water. The reddish-brown prismatic shirl from Vesuvius contains 48 of siliceous earth, 40 of argil, five of calx, one of magnesia, and five of iron. Other kinds, however, have afforded 50 per cent. of siliceous earth, 30 of argillaceous, one or two of magnesia, and 18 or 20 of iron. The white sort probably contain less iron, but all become reddish by calcination. Cronstedt informs us that he has heard of lead being melted out of a kind of cockle from Rodbeck's Eng at Umea in Lapland; and he also thinks it very probable, that some of the cockles found in the English tin mines may contain tin. Some crystals of cockle are more fusible than any sort of stone whatever; these are always glassy and semitransparent.

Cockney mitransparent. The precise figure of the cockle, tho' always prismatical, is uncertain: that from Yxio, at Nya Kopparberg, is quadrangular; the French kind has nine sides or planes, and the taufflein is hexagonal.

COCKNEY, a very ancient nickname for a citizen of London. Ray says, an interpretation of it is, A young person coaxed or cocquered, made a wanton, or nestle-cock, delicately bred and brought up, so as when arrived at man's estate to be unable to bear the least hardship. Another, A person ignorant of the terms of country oeconomy, such as a young citizen, who having been ridiculed for calling the neighing of a horse laughing, and told that it was called neighing, next morning, on hearing the cock crow, to show instruction was not thrown away upon him, exclaimed to his former instructor, How that cock neighs! whence the citizens of London have ever since been called cock-neighs, or cockneys. Whatever may be the origin of this term, we at least learn from the following verses, attributed to Hugh Bagot earl of Norfolk, that it was in use in the time of king Henry II.

Was I in my castle at Bungay,
Fast by the river Waveney,
I would not care for the king of cockney.
(i. e. the king of London)

The king of the cockney occurs among the regulations for the sports and shows formerly held in the Middle Temple, on Childermas day, where he had his officers, a marshal, constable, butler, &c.—See Dugdale's *Origines Juridicales*, p. 247.

COCKROACH. See **BLATTA**. In Captain Cook's last voyage, the ships, while at Huaheine, were infested with incredible numbers of these creatures, whom it was found impossible by any means to destroy. Every kind of food, when exposed only for a few minutes, was covered with these noxious insects, and pierced so full of holes, that it resembled an honey-comb. They were particularly destructive to birds which had been stuffed for curiosities, and were so fond of ink, that they ate out the writing on labels. Books, however, were secured from their ravages by the closeness of the binding, which prevented them from getting in between the leaves. They were of two kinds, the *Blatta Orientalis*, and *Germanica*.

COCKSWAIN, or **Cockson**, an officer on board a man of war, who hath the care of the boat, or sloop, and all things belonging to it. He is to be always ready with his boat's gang or crew, and to man the boat on all occasions. He sits in the stern of the boat, and steers; and hath a whistle to call and encourage his men.

COCLES, (Pub. Horat.) a celebrated Roman, who alone opposed the whole army of Porfenna at the head of a bridge, while his companions behind him were cutting off the communication with the other shore. When the bridge was destroyed, Cocles, tho' wounded by the darts of the enemy, leapt into the Tiber, and swam across it with his arms. A brazen statue was raised to him in the temple of Vulcan, by the consul Publicola, for his eminent services.

COCOA, in botany. See **Cocos**.

COCONATO, a town of Piedmont in Italy, famous for being the birth-place of Columbus, who first discovered America. E. Long. 8. o. N. Lat. 44. 50.

COCOS, in botany: A genus belonging to the natural order of *Palma*. The calyx of the male is tripar-

tite; the corolla tripetalous, with six stamina. The calyx of the female quinquepartite; the corolla tripetalous; the stigmata three, and the plum coriaceous. There is only one species known, which is cultivated in both the Indies, and is of the greatest use to the inhabitants. It is supposed to be a native of the Maldive and some desert islands in the East Indies; and from thence to have been transported to all the warm parts of America: for it is not found in any of the inland parts, nor any where far distant from settlements. The tree frequently rises 60 feet high. The body of the trunk, which generally leans to one side, occasioned, as is supposed, by the great weight of nuts it sustains when young, is the exact shape of an apothecary's large iron pestle, being of an equal thickness at top and at bottom, but somewhat smaller in the middle; its colour is of a pale brown throughout, and the bark smooth. The leaves or branches are often 14 or 15 feet long, about 28 in number, winged, of a yellow colour, straight and tapering. The pinnae or partial leaves are green, often three feet long next the trunk, but diminishing in length toward the extremity of the branches. The branches are fastened at top by brown stringy threads that grow out of them, of the size of ordinary pack-thread, and are interwoven like a web. The nuts hang at the top of the trunk, in clusters of a dozen in each. Each nut, next the stem, has three holes closely stopped; one of them being wider, and more easily penetrated than the rest. When the kernel begins to grow, it incrusts the inside of the nut in a bluish, jelly-like substance; as this grows harder, the inclosed liquid, distilled into the nut from the roots, becomes somewhat acid; and the kernel, as the nut ripens, becomes still more solid; and at length lines the whole inside of the nut for above a quarter of an inch thick, being as white as snow, and of the flavour of an almond. The quantity of liquor in a full grown nut is frequently a pint and upwards. The husky tegument of the nut consists of strong, tough, stringy filaments, which, when removed from the fruit, resemble coarse oakum, and may perhaps be conveniently enough used as such. The shells of these nuts, being tipped with silver, are frequently used for drinking bowls. The bark of the tree may be wrought into cordage, and the leaves into baskets, brooms, hammocks in form of nets, mats, sacks, and other useful utensils. The liquor contained in the shell is a most cooling wholesome beverage in those sultry climates, and the white kernel a most agreeable food. The Maldive cocoa-nut is esteemed, by the inhabitants of these islands, as a powerful antidote against the bites of serpents, and other poisons. The cocoa-nut tree is propagated by planting the nuts; which, in six weeks or two months time, will come up, provided they are fresh and thoroughly ripe; but this is what few of them are when brought into this country; for they always gather them before they are ripe, that they may keep during their passage. The best way, therefore, would be to gather such nuts as are thoroughly ripe in their native country, and plant them in a tub of dry sand in order to keep them from the vermin during their passage. Here they will frequently sprout, which will be an advantage; as they may then be immediately planted in pots of earth, and plunged in the bark-stove.

COCTION,

Coc-tion
||
Codia.

COCTION, a general term for all alterations made in bodies by the application of fire or heat.

COCYTUS, one of the rivers of hell, according to the theology of the poets. It has its name *αἰὼς τὴν κῆρυξ*, from groaning and lamenting. Hence Milton, Cocytus nam'd of lamentation loud,
Heard on the rueful stream.

It was a branch of the river Styx; and flowed, according to Horace, with a dull and languid stream.

COD, in ichthyology. See **GADUS** and **FISHERY**.

COD is also a term used, in some parts of the kingdom, for a pod. See **POD**.

COD-CAPE, a promontory on the coast of New England, near the entrance of Boston harbour. W. Long. 69. 50. N. Lat. 42. 0.

CODDY-MODDY, the English name of a species of **LARUS**.

CODE (*codex*), a collection of the laws and constitutions of the Roman emperors, made by order of Justinian. The word comes from the Latin *codex*, "a paper book; so called à *codicibus*. or *caudicibus arborum*, "the trunks of trees;" the bark whereof being stripped off, served the ancients to write their books on.

The code is accounted the second volume of the civil law, and contains twelve books; the matter of which is nearly the same with that of the digests, especially the first eight books: but the style is neither so pure, nor the method so accurate, as that of the digests; and it determines matters of daily use, whereas the digests discuss the more abstruse and subtle questions of the law, giving the various opinions of the ancients lawyers. Although Justinian's code is distinguished by the appellation of *code*, by way of eminence, yet there were codes before his time; such were, 1. The Gregorian code, and Hermogenean code; collections of the Roman laws, made by two famous lawyers, Gregorius and Hermogenes, which included the constitutions of the emperors from Adrian to Dioclesian and Maximinus. 2. The Theodosian code, comprised in 16 books, formed out of the constitutions of the emperors from Constantine the Great to Theodosius the Younger: this was observed almost over all the west, till it was abrogated by the Justinian code. There are also several later codes, particularly the ancient Gothic, and those of the French kings; as the code of Euridic, code-Lewis, code-Henry, code-Marchande, code des Eaux, &c.; and the present king of Prussia has lately published a code, which comprises the laws of his kingdom in a very small volume.

CODEX, in antiquity, denotes a book or tablet on which the ancients wrote. See **CODEX**.

CODEX also denoted a kind of punishment by means of a clog or block of wood, to which slaves who had offended were tied fast, and obliged to drag it along with them; and sometimes they sat on it closely bound.

CODIA, among botanists, signifies the head of any plant, but more particularly a poppy head; whence its syrup is called *diacodium*.

CODIA, in botany: A genus of the digynia order, belonging to the octandria class of plants. The calyx is tetraphyllous, with small oblong horizontal leaves; the corolla consists of four very small linear petals; the stamina are eight filaments twice as long as the calyx; the antheræ are roundish.

CODICIL, is a writing, by way of supplement to a will, when any thing is omitted that the testator would have added, or wants to be explained, altered, or recalled.

CODLIN, an apple useful in the kitchen, being the most proper for baking.

CODLING, an appellation given to the cod-fish when young. See **GADUS**.

CODON (*Κωδων*), in antiquity, a cymbal, or rather little brass bell, resembling the head of a poppy. They were fastened to the trappings and bridles of horses.

CODON, in botany: A genus of the monogynia order, belonging to the decandria class of plants. The calyx is decempartite, with the segments alternately long and short; the corolla campanulated, with the limb decempartite and equal; the nectarium decemlocular, of ten scales inserted into the heels of the stamina; the seed-case bilocular; the seeds hairy, roundish, in a dry coloured pulp.

CODRINGTON (Christopher), a brave English officer, and not less distinguished for his learning and benevolence; was born at Barbadoes in the year 1668, and educated at Oxford; after which he betook himself to the army; and, by his merit and courage, soon recommending himself to the favour of King William, was made a captain in the first regiment of foot-guards. He was at the siege of Namur in 1695; and, upon the conclusion of the peace of Ryswick, was made captain-general and governor in chief of the Leeward and Caribbee islands. However, in 1701, several articles were exhibited against him to the house of commons in England; to which he published a distinct and particular answer, and was honourably acquitted of all imputations. In 1703, he showed great bravery at the attack of Gaudaloupe: but at last he resigned his government, and lived a studious retired life; for a few years before his death, he chiefly applied himself to church-history and metaphysics. He died at Barbadoes, on the 7th of April 1710, and was buried there the day following; but his body was afterwards brought over to England, and interred, on the 19th of June 1716, in the chapel of All-Souls College, Oxford. By his last will, he bequeathed his plantations in Barbadoes, and part of the island of Barbuda, to the society for propagating the gospel in foreign parts; and left a noble legacy to All-Souls College, of which he had been a fellow. This legacy consisted of his library, which was valued at 6000l.; and 10,000l. to be laid out, 6000 in building a library, and 4000 in furnishing it with books. He wrote some of the poems in the *Musæ Anglicanæ*, printed at London in 1741.

CODRUS, the 17th and last king of Athens, son of Melanthus. When the Heraclidæ made war against Athens, the oracle said that the victory would be granted to that nation whose king was killed in battle. The Heraclidæ upon this gave strict orders to spare the life of Codrus; but the patriotic king disguised himself and attacked one of the enemy, by whom he was killed. The Athenians obtained the victory, and Codrus was deservedly called the father of his country. He reigned 21 years, about 2153 years before the Christian era. To pay more honour to his memory, the Athenians made a resolution that no man after Codrus should reign in Athens under the name of king.

Codicil
||
Codrus.

Coecum

Coelus.

CEOCUM, or BLIND-GUT. See ANATOMY, n° 93.

Dr Musgrave gives us an account, in the Philosophical Transactions, of the cœcum of a dog being cut out without any prejudice to the animal. Mr Giles gives us another of the cœcum of a lady being distended so as to form a tumor that held almost three chopins of a thin, greyish, almost liquid substance, of which she died. And Mr Knowler a third, of a boy's cœcum being vastly extended and stuffed with cherry-stones, which likewise proved mortal.

COEFFICIENTS, in algebra, are such numbers or known quantities as are put before letters or quantities, whether known or unknown, and into which they are supposed to be multiplied. Thus, in $3x$, ax , or bx ; 3, a and b , are the coefficients of x : and in $6a$, $9b$; 6, and 9, are the coefficients of a and b . See ALGEBRA.

COELESTIAL, or CELESTIAL, in general, denotes any thing belonging to the heavens: thus we say, *caelestial observations, the caelestial globe, &c.*

COELIAC ARTERY, in anatomy, that artery which issues from the aorta, just below the diaphragm. See ANATOMY, n° 123.

COELIAC Vein, in anatomy, that running through the intestinum rectum, along with the cœliac artery.

COELIMONTANA PORTA (Pliny), one of the gates of Rome, situated at the foot of mount Cœlius; and hence its name: though it be the ancient *Asinaria* by some; but this others doubt. By this gate Alaric with his Goths is said to have entered and plundered Rome.

COELIOBRIGA (anc. geog.), a town of the Bracari in the Hither Spain, to the south of Bracara Augusta, the north of the Durius, and not far from the Atlantic; a municipium (Coin). Now thought to be *Barcelos*, a town of Entre Minho y Duero. W. Long. 9. 15. Lat. 41. 20.

COELIUS MONS, one of the seven hills of Rome; so called from *Cœles*, a Tuscan captain, who came to the assistance of Romulus against the Sabines, (Dionysius Halicarnassæus). Called also *Querculanus*, or *Quercetulanus*, from the oaks growing on it; and *Augustus*, by Tiberius (Tacitus Suetonius). To the east it had the city walls, on the south the Coeliolus, to the west the Palatine, and on the north the Esquilæ.

COELIOLUS, a part of mount Cœlius to the south, called *Minor Cælius* (Martial); having the city walls on the east, the Aventine to the south, on the west and north the valley through which the rivulet of the Appia runs.

COELOMA, among physicians, a hollow ulcer, seated in the tunica cornea of the eye.

COELOS PORTUS (anc. geog.), a town of the Chersonesus of Thrace, to the south of Sestos; where the Athenians erected a trophy, after a sea victory over the Lacedæmonians (Diodorus Siculus).

COELOSYRIA, in the larger sense of the word, was the name of the whole country lying southward of Seleucia, and extending as far as Egypt and Arabia: but this word is principally applied to the valley lying between Libanus and Antilibanus. This word occurs only in the apocryphal writings of the Old Testament.

COELUS (Heaven), in Pagan mythology, the son of Æther and Dies or Air and Day. According to

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Hesiod, he married Terra or the Earth: on whom he begat Aurea or the Mountains, the Ocean, &c. But having at length imprisoned the Cyclops, who were also his children, his wife, being offended, incited her son Saturn to revenge the injury done to his brothers; and, by her assistance, he bound and castrated Cœlus, when the blood that flowed from the wound produced the three furies, the giants, and the wood nymphs; and the genital parts beings thrown into the sea, impregnated the waters, and formed the goddess Venus. This deity was called by the Greeks *Uranus*.

COEMETERY. See CEMETRY.

COEMPTIONALES, among the Romans, an appellation given to old slaves, which were sold in a lot with others, because they could not be sold alone.

COENOBITE, a religious who lives in a convent, or in community, under a certain rule; in opposition to anachoret, or hermit, who lives in solitude. The word comes from the Greek *κοινὸς communis*; and *βίη vita*, "life". Cassian makes this difference between a *convent* and a *monastery*, that the latter may be applied to the residence of a single religious or recluse; whereas the *convent* implies *canobites*, or numbers of religious living in common. Fleury speaks of three kinds of monks in Egypt; *anachorets*, who live in solitude; *canobites*, who continue to live in community; and *farabaites*, who are a kind of monks-errant, that stroll from place to place. He refers the institutions of cœnobites to the times of the apostles, and makes it a kind of imitation of the ordinary lives of the faithful at Jerusalem. Though St Pachomius is ordinarily owned the institutor of the cœnobite life; as being the first who gave a rule to any community.

COENOBIMUM, *κοινοβιον*, the state of living in a society, or community, where all things are common. Pythagoras is thought to be the author or first institutor of this kind of life; his disciples, though some hundreds in number, being obliged to give up all their private estates, in order to be annexed to the joint stock of the whole. The Essenians among the Jews and Platonists are said to have lived in the same manner. Many of the Christians also have thought this the most perfect kind of society, as being that in which Christ and his apostles chose to live.

COESFELDT, a town of Germany, in Westphalia, and in the territories of the bishop of Munster, where he often resides. It is near the river Burkel. E. Long. 8. 2. N. Lat. 51. 58.

COEVORDEN, one of the strongest towns in the United Provinces, in Overijssel, fortified by the famous Cohorn. It was taken by the bishop of Munster, 1763; and the Dutch retook it the same year. It is surrounded by a morass. E. Long. 6. 41. N. Lat. 52. 40.

COFFEA, the COFFEE TREE: A genus of the monogynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 47th order, *Stellata*. The corolla is funnel-shaped; the stamina above the tube; the berry inferior, dispermous; the seeds arillated, or having a proper exterior covering dropping off of its own accord. There is but one species, supposed to be a native of Arabia Felix. It seldom rises more than 16 or 18 feet in height; the main stem grows upright, and is covered with a light brown bark; the branches are produced

hori-

Coemetery

Coiffa.

Coffee.

horizontally and opposite, crossing each other at every joint; so that every side of the tree is fully garnished with them, and they form a sort of pyramid. The leaves also stand opposite; and when fully grown are about four or five inches long, and two broad in the middle, decreasing toward each end; the borders are waved, and the surface is of a lucid green. The flowers are produced in clusters at the root of the leaves, sitting close to the branches; they are tubulous, and spread open at the top, where they are divided into five parts; they are of a pure white, and have a very grateful odour, but are of short duration. The fruit, which is the only useful part, resembles a cherry. It grows in clusters, and is ranged along the branches under the axillæ of the leaves, of the same green as the laurel, but something longer. When it comes to be of a deep red, it is gathered for the mill, in order to be manufactured into those *coffee-beans* now so generally known. The mill is composed of two wooden rollers furnished with iron plates 18 inches long, and 10 or 12 in diameter. These moveable rollers are made to approach a third which is fixed, and which they call the *chops*. Above the rollers is a hopper, in which they put the coffee, from whence it falls between the rollers and the chops, where it is stripped of its first skin, and divided into two parts, as may be seen by the form of it after it has undergone this operation; being flat on the one side and round on the other. From this machine it falls into a brass sieve, where the skin drops between the wires, while the fruit slide over them into baskets placed ready to receive it: it is then thrown into a vessel full of water, where it soaks for one night, and is afterwards thoroughly washed. When the whole is finished, and well dried, it is put into another machine called the *peeling-mill*. This is a wooden grinder, turned vertically upon its trendle by a mule or horse. In passing over the coffee it takes off the parchment, which is nothing but a thin skin that detaches itself from the berry in proportion as it grows dry. The parchment being removed, it is taken out of this mill to be put into another, which is called the *winnowing-mill*. This machine is provided with four pieces of tin fixed upon an axle, which is turned by a slave with considerable force; and the wind that is made by the motion of these plates clears the coffee of all the pellicles that are mixed with it. It is afterwards put upon a table, where the broken berries, and any filth that may remain among them, are separated by negroes, after which the coffee is fit for sale.

The coffee-tree is cultivated in Arabia, Persia, the East Indies, the Isle of Bourbon, and several parts of America. It is also raised in botanic gardens in several parts of Europe. Prince Eugene's garden at Vienna produced more coffee than was sufficient for his own consumption. It delights particularly in hills and mountains, where its root is almost always dry, and its head frequently watered with gentle showers. It prefers a western aspect, and ploughed ground without any appearance of grass. The plants should be placed at eight feet distance from each other, and in holes twelve or fifteen inches deep. If left to themselves, they would rise to the height of 16 or 18 feet, as already observed; but they are generally stunted to five, for the convenience of gathering their fruit

with the greater ease. Thus dwarfed, they extend their branches so, that they cover the whole spot round about them. They begin to yield fruit the third year, but are not in full bearing till the fifth. With the same infirmities that most other trees are subject to, these are likewise in danger of being destroyed by a worm or by the scorching rays of the sun. The hills where the coffee-trees are found have generally a gravelly or chalk bottom. In the last, it languishes for some time and then dies: in the former its roots, which seldom fail of striking between stones, obtain nourishment, and keep the tree alive and fruitful for 30 years. This is nearly the period for plants of the coffee-tree. The proprietor, at the end of this period, not only finds himself without trees, but has his land reduced, that it is not fit for any kind of culture; and unless he is so situated, that he can break up a spot of virgin land, to make himself amends for that which is totally exhausted by the coffee-trees, his loss is irreparable.

The coffee produced in Arabia is found so greatly to excel that raised in the American plantations or elsewhere, that the cultivation of the tree is now but seldom practised in any of the British colonies. Large plantations of this kind were formerly made in some of them; and it was proposed to the parliament to give a proper encouragement for cultivating this commodity there, so as to enable the planters to undersell the importers from Arabia. Accordingly, there was an abatement of the duty payable on all coffee imported from our colonies in America, which at that time was supposed to be sufficient encouragement for this kind of commerce; but the inferiority of the American coffee to the Arabian hath almost ruined the project. Mr Miller proposes some improvements in the method of cultivation. According to him, the trees are planted in too moist a soil, and the berries are gathered too soon. They ought, he says, to be permitted to remain on the trees till their skins are shrivelled, and they fall from the trees when shaken. This will indeed greatly diminish their weight, but the value of the commodity will thereby be increased to more than double of that which is gathered sooner. In Arabia, they always shake the berries off the trees, spreading cloths to receive them, and only take such as readily fall at each time. Another cause may be the method of drying the berries. They are, he observes, very apt to imbibe moisture, or the flavour of any thing placed near them. A bottle of rum placed in a closet, in which a canister of coffee-berries closely stopped was standing on a shelf at a considerable distance, in a few days so impregnated the berries as to render them very disagreeable: the same hath also happened by a bottle of spirit of wine standing in the same closet with coffee and tea, both which were in a few days spoiled by it. Some years ago, a coffee-ship from India had a few bags of pepper put on board, the flavour of which was imbibed by the coffee, and the whole cargo spoiled. For these reasons, Mr Miller directs that coffee-berries should never be brought over in ships freighted with rum, nor laid to dry in the houses where sugars are boiled or rum distilled. When they are fully ripe, they should be shaken off when the trees are perfectly dry, and spread upon cloths in the sun to dry, carrying them every evening

Coffee.

Coffee. under cover, to prevent the dews or rain from falling on them. When perfectly dry, they should have their outer skins beaten off, and then be carefully packed up in cloths or bags three or four times double.

The coffee-tree, as we have already observed, is sometimes cultivated in European gardens; but for this it requires the assistance of a stove. It makes a fine appearance at all seasons of the year (being an evergreen), but especially when in flower, and when the berries are red, which is generally in the winter, so that they continue a long time in that state. It is propagated from the berries; but they must be planted immediately when gathered from the tree, for they lose their vegetative quality in a very short time: when sent abroad by the post, they have constantly failed in those that have been a fortnight on their journey; so that where these trees are desired, the young plants must be sent, if it be at any distance from the place where they grow. The fresh berries may be planted in small pots, and plunged into a hot-bed of tanners bark. If the bed be of a proper temperature, the young plants will appear in a month or five weeks time; and in six weeks more will be ready for transplanting into several pots. During summer, they must be frequently watered; but not in too great plenty, otherwise the roots will be apt to rot. The first sign of the plants being disordered is their leaves sweating out a clammy juice; after which they are over-run with insects, that cannot be destroyed till the plants have recovered their health; so that on the first appearance of these insects, the trees should be removed into fresh earth, and all possible care taken to recover them. The disorders incident to them, generally proceed either from their having been put into large pots, or from the earth about them being too stiff or over-watered. The most proper soil for them is that of a kitchen-garden, which is naturally loose, and not subject to bind, especially if it has constantly been well wrought and dunged.

COFFEE also denotes a kind of drink, prepared from those berries; very familiar in Europe for these 100 years, and among the Turks for 170.

Its original is not well known. Some ascribe it to the prior of a monastery; who being informed by a goat-herd, that his cattle sometimes browsing on the tree would wake and caper all night, became curious to prove its virtue: accordingly, he first tried it on his monks, to prevent their sleeping at matins. Others, from Sehehabeddin, refer the invention of coffee to the Persians: from whom it was learned in the 15th century by Gemaleddin, mufti of Aden, a city near the mouth of the Red Sea; and who having tried its virtues himself, and found that it dissipated the fumes which oppressed the head, inspired joy, opened the bowels, and prevented sleep, without being incommoded by it, recommended it first to his dervises, with whom he used to spend the night in prayer. Their example brought coffee into vogue at Aden; the professors of the law for study, artisans to work, travellers to walk in the night, in fine, every body at Aden drank coffee. Hence it passed to Mecca; where first the devotees, then the rest of the people, took it. From Arabia Felix it passed to Cairo. In 1511, Kahie Beg prohibited it, from a persuasion that it inebriated, and inclined to things forbidden. But

Sultan Causou immediately after took off the prohibition; and coffee advanced from Egypt to Syria and Constantinople. The dervises declaimed against it from the Alcoran, which declares, that coal is not of the number of things created by God for food. Accordingly, the mufti ordered the coffee-houses to be shut; but his successor declaring coffee not to be coal, they were again opened. During the war in Candia, the assemblies of news-mongers making too free with state affairs, the grand visir Cuproli suppressed the coffee-houses at Constantinople: which suppression, though still on foot, does not prevent the public use of the liquor there. Thevenot, the traveller, was the first who brought it into France; and a Greek servant, named *Pasqua*, brought into England by Mr Dan. Edwards, a Turkey merchant, in 1652, to make his coffee, first set up the profession of *coffee-man*, and introduced the drink into this island.

The word *coffee* is originally Arabic: the Turks pronounce it *caheub*, and the Arabians *cabuah*; which some authors maintain to be a general name for any thing that takes away the appetite, others for any thing that promote appetite, and others again for any thing that gives strength and vigour.—The Mahometans, it is observed, distinguish three kinds of *cabuah*. The first is wine, or any liquor that inebriates: the second is made of the pods that contain the coffee-berry; this they call the *Sultan's coffee*, from their having first introduced it on account of its heating less than the berry, as well as its keeping the bowels open: the third is that made with the berry itself, which alone is used in Europe, the pods being found improper for transportation. Some Europeans who imported the pods called them the *flower of the coffee-tree*. The deep brown colour of the liquor occasioned its being called *syrup of the Indian mulberry*, under which specious name it first gained ground in Europe.

The preparation of coffee consists in roasting, or giving it a just degree of torrefaction on an earthen or metalline plate, till it have acquired a brownish hue equally deep on all sides. It is then ground in a mill, as much as serves the present occasion. A proper quantity of water is next boiled, and the ground coffee put into it. After it has just boiled, it is taken from the fire, and the decoction having stood a while to settle and fine, they pour or decant it into dishes. The ordinary method of roasting coffee amongst us is in a tin cylindrical box full of holes, through the middle whereof runs a spit: under this is a semicircular hearth, whereon is a large charcoal-fire: by help of a jack the spit turns swift, and so roasts the berry; being now and then taken up to be shaken. When the oil rises, and it is grown of a dark brown colour, it is emptied into two receivers made with large hoops whose bottoms are iron plates: there the coffee is shaken, and left till almost cold; and if it look bright and oily, it is a sign it is well done.

Very different accounts have been given of the medicinal qualities of this berry. To determine its real effects on the human body, Dr Percival has made several experiments, the result of which he gives in the following words: "From these observations we may infer, that coffee is slightly astringent, and antiseptic; that it moderates alimentary fermentation, and is powerfully sedative. Its action on the nervous system

Coffee.

Coffee,
Coffer.

probably depends on the oil it contains; which receives its flavour, and is rendered mildly empyreumatic, by the process of roasting. Neumann obtained by distillation from one pound of coffee, five ounces five drachms and a half of water, six ounces and half a drachm of thick fetid oil, and four ounces and two drachms of a caput mortuum. And it is well known, that rye, torrefied with a few almonds, which furnish the necessary proportion of oil, is now frequently employed as a substitute for these berries.

"The medicinal qualities of coffee seem to be derived from the grateful sensation which it produces in the stomach, and from the sedative powers it exerts on the *vis vitæ*. Hence it assists digestion, and relieves the headach; and is taken in large quantities, with peculiar propriety, by the Turks and Arabians; because it counteracts the narcotic effects of opium, to the use of which those nations are much addicted.

"In delicate habits, it often occasions watchfulness, tremors, and many of those complaints which are denominated nervous. It has been even suspected of producing palsies; and from my own observation, I should apprehend not entirely without foundation. Slare affirms, that he became paralytic by the too liberal use of coffee, and that his disorder was removed by abstinence from that liquor.

"The following curious and important observation is extracted from a letter with which I was honoured by Sir John Pringle, in April 1773: 'On reading your section concerning coffee, one quality occurred to me which I had observed of that liquor, confirming what you have said of its sedative virtues. It is the best abater of the paroxysms of the periodic asthma that I have seen. The coffee ought to be of the best Mocco, newly burnt, and made very strong immediately after grinding it. I have commonly ordered an ounce for one dish; which is to be repeated fresh after the interval of a quarter or half an hour; and which I direct to be taken without milk or sugar. The medicine in general is mentioned by Masgrave, in his treatise *De arthritide anomala*. but I first heard of it from a physician in this place, who having once practised it in Litchfield, had been informed by the old people of that place, that Sir John Floyer, during the latter year of his life, kept free from, or at least lived easy under, his asthma, from the use of very strong coffee. This discovery, it seems, he made after the publication of his book upon that disease.' Since the receipt of that letter, I have frequently directed coffee in the asthma with great success."

COFFER, in architecture, a square depresso or sinking in each interval between the modillions of the Corinthian cornice; ordinarily filled up with a rose; sometimes with a pomegranate, or other enrichment.

COFFER, in fortification, denotes a hollow lodgement, athwart a dry moat, from 6 to 7 feet deep, and from 16 to 18 broad; the upper part made of pieces of timber raised two feet above the level of the moat; which little elevation has hurdles laden with earth for its covering, and serves as a parapet with embrasures: the coffer is nearly the same with the caponiere, excepting that this last is sometimes made beyond the counterscarp on the glacis; and the coffer always in the moat taking up its whole breadth, which the caponiere does not. It differs from the

traverse and gallery, in that these latter are made by the besiegers, and the coffer by the besieged. The besieged generally make use of coffers to repulse the besiegers when they endeavour to pass the ditch. To save themselves from the fire of these coffers, the besiegers throw up the earth on that side towards the coffer.

COFFERER of the KING'S HOUSEHOLD, a principal officer in the court, next under the comptroller. He was likewise a white-staff officer, and always a member of the privy council. He had a special charge and oversight of the other officers of the household. He paid the wages of the king's servants below stairs, and for provisions as directed by the board of green cloth. This office is now suppressed, and the business of it is transacted by the lord steward, and paymaster of the household. He had L. 100 a-year wages, and L. 400 a-year board-wages.

COFFIN, the chest in which dead bodies are put into the ground.

The sepulchral honours paid to the manes of departed friends in ancient times, demand attention, and are extremely curious. Their being put into a coffin has been particularly considered as a mark of the highest distinction. With us the poorest people have their coffins. If the relations cannot afford them, the parish is at the expence. On the contrary, in the east they are not at all made use of in our times; Turks and Christians, as Thevenot assures us, agree in this. The ancient Jews seem to have buried their dead in the same manner: neither was the body of our Lord, it should seem, put into a coffin; nor that of Elisha, 2 Kings xiii. 21. whose bones were touched by the corpse that was let down a little after into his sepulchre. However, that they were anciently made use of in Egypt, all agree; and antique coffins of stone, and sycamore-wood, are still to be seen in that country; not to mention those said to be made of a kind of pasteboard; formed by folding or glueing cloth together a great many times, curiously plastered, and then painted with hieroglyphics. Its being an ancient Egyptian custom, and not practised in the neighbouring countries, were, doubtless, the cause that the sacred historian expressly observes of Joseph, that he was not only embalmed, but put into a coffin too*; both being managements peculiar to the Egyptians. Gen. 1. 26.

Bishop Patrick, in his commentary on this passage, takes notice of these Egyptian coffins of sycamore wood and of pasteboard; but he doth not mention the contrary usage in the neighbouring countries, which was requisite, one might suppose, in order fully to illustrate the place: but even this perhaps would not have conveyed the whole idea of the sacred author. Maillet apprehends that all were not inclosed in coffins who were laid in the Egyptian repositories of the dead; but that it was an honour appropriated to persons of figure: for after having given an account of several riches found in those chambers of death, he adds †, "But it must not be imagined that the bodies deposited in these gloomy apartments were all inclosed in chests, and placed in niches. The greatest part were simply embalmed and swathed after that manner which every one hath some notion of; after which they laid them one by the side of another without any ceremony. Some were even laid

Cofferer,
Coffin.† Let. vii.
p. 281.

Coffin
||
Cognate.

in these tombs without any embalming at all; or such a slight one, that there remains nothing of them in the linen in which they were wrapped, but the bones, and those half rotten. It is probable, that each considerable family had one of those burial-places to themselves; that the niches were designed for the bodies of the heads of the families; and that those of their domestics or slaves had no other care taken of them than the laying them on the ground, after having been embalmed, or even without that; which, without doubt, was also all that was done even to the heads of families of less distinction." After this he gives an account of a way of burial, practised anciently in that country, which had been but lately discovered; and which consisted in placing the bodies, after they were swathed, upon a layer of charcoal, and covering them with a mat, under a depth of sand of seven or eight feet.

That *coffins* then were not universally used in Egypt, is undoubted from these accounts; and probably they were only persons of distinction who were buried in them. It is also reasonable to believe, that in times so remote as that of Joseph, they might be much less common than afterwards; and consequently, that Joseph's being put in a coffin in Egypt might be mentioned with a design to express the great honours which the Egyptians did him at his death, as well as in life, being interred after the most sumptuous manner of the Egyptians, *embalmed*, and *put into a coffin*. Agreeably to this, the Septuagint version, which was made for Egyptians, seems to represent coffins as a mark of grandeur. Job xxi. 32.

It is no objection to this account, that the widow of Nain's son is represented as carried forth to be buried in a *sepulchre*, or "on a bier:" for the present inhabitants of the Levant, who are well known to lay their dead bodies in the earth uninclosed, carry them frequently out to burial in a kind of coffin. So Dr Ruffel, in particular, describes the bier used for the Turks at Aleppo, as a kind of coffin much in the form of ours, only that the lid rises with a ledge in the middle. Christians, indeed, as he tells us, are carried to the grave on an open bier: but as the most common kind of bier resembles our coffins, that used by the people of Nain might very possibly be of the same kind; in which case the word *sepulchre* was very proper.

COGGLE, or Cog, a small fishing-boat upon the coasts of Yorkshire: and cogs (cogones) are a kind of little ships or vessel used in the rivers Ouse and Humber; (Stat. 23. H. VIII. c. 18.) *Præparatis cogonibus, galleis, & aliis navebus, &c.* (Mat. Paris. ann. 1066.) And hence the cogmen, boatmen, and seamen, who after shipwreck or losses by sea travelled and wandered about to defraud the people by begging and stealing, until they were restrained by proper laws.

COGITATION, a term used by some for the act of thinking.

COGNAC, a town of France in Angoumois, with a castle, where Francis I. was born. It is seated on the river Charante, in a very pleasant country, abounding in wine, and remarkable for excellent brandy. W. Long. 0. 10. N. Lat. 45. 42.

COGNATE, in Scots law, any male relation thro' the mother.

COGNATION, in the civil law, a term for that line of consanguinity which is between males and females, both descended from the same father; as agnation is for the line of parentage between males only descended from the same stock.

COGNI, an ancient and strong town of Caramania in Turkey in Asia, and the residence of a beglerbeg. It is seated in a pleasant country, abounding in corn, fruits, pulse, and cattle. Here are sheep whose tails weigh 30 pounds. E. Long. 32. 56. N. Lat. 37. 56.

COGNITIONIS CAUSA, in Scots law. When a creditor changes the heir of his debtor to enter, in order to constitute the debt against him, and the heir renounces the succession, the creditor can obtain no decret of constitution of that debt against the heir; but only a decret subjecting the *hereditas jacens*, or the estate which belonged to the debtor, to his diligence: and this is called a decret *cognitionis causa*.

COGNIZANCE, or CONNUSANCE, in law, has divers significations. Sometimes it is an acknowledgement of a fine, or confession of something done; sometimes the hearing of a matter judicially, as to take cognizance of a cause; and sometimes a particular jurisdiction, as cognizance of pleas is an authority to call a cause or plea out of another court, which no person can do but the king, except he can show a charter for it. This cognizance is a privilege granted to a city or a town to hold plea of all contracts, &c. within the liberty; and if any one is impleaded for such matters in the courts at Westminster, the mayor, &c. of such franchise may demand cognizance of the plea, and that it may be determined before them.

COGNIZANCE is also used for a badge on a waterman's or serving-man's sleeve, which is commonly the giver's crest, whereby he is decerned to belong to this or that nobleman or gentleman.

COGS. See COGGLE.

COHABITATION, denotes the state of a man and a woman who live together without being legally married. By the common law of Scotland, cohabitation for year and day, or a complete twelvemonth, is deemed equivalent to matrimony.

CO-HEIR, one who succeeds to a share of an inheritance, to be divided among several.

COHESION, one of the four species of attraction, denoting that force by which the parts of bodies adhere or stick together.

This power was first considered by Sir Isaac Newton as one of the properties essential to all matter, and the cause of all that variety we observe in the texture of different terrestrial bodies. He did not, however, absolutely determine that the power of cohesion was an immaterial one; but thought it might possibly arise, as well as that of gravitation, from the action of an ether. His account of the original constitution of matter is as follows: It seems probable, that God in the beginning formed *matter* in solid, massy, impenetrable, moveable particles; of such sizes, figures, and other properties, and in such proportion to space, as most conduced to the end for which he formed them: and that these primitive particles being solid, are incomparably harder than any porous bodies composed of them; even so very hard as never to wear or break in pieces; no ordinary power being able to divide what God himself made one at the first creation. While

Cognition
Cohesion.

Considered by Sir Isaac Newton as an essential property of matter.

His account of the original constitution of matter.

the

Cohesion. the particles continue entire, they may compose bodies of one and the same nature and texture in all ages; but should they wear away, or break in pieces, the nature of all things depending on them would be changed. Water and earth composed of old worn particles and fragments of particles, would not now be of the same texture with water and earth composed of entire particles in the beginning. And therefore, that nature may be lasting, the changes of corporeal things are to be placed in the various separations and new associations and motions of these permanent particles; compound bodies being apt to break, not in the midst of solid particles, but where these particles are laid together, and touch in a few points." It seems farther, "That these particles have not only a *vis inertiae*, accompanied with such passive laws of motion as naturally result from that force; but also that they are moved by certain active principles such as that of gravity, and that which causeth fermentation and the cohesion of bodies. These principles are to be considered not as occult qualities, supposed to result from the specific forms of things, but as general laws of nature by which the things themselves are formed; their truth appearing to us by phenomena, though their cause is not yet discovered."

3
Attraction
the general
law of na-
ture.

The general law of nature, by which all the different bodies in the universe are composed, according to Sir Isaac Newton, is that of attraction: *i. e.* "Every particle of matter has an attractive force, or a tendency to every other particle; which power is strongest in the point of contact, and suddenly decreases, insomuch that it acts no more at the least sensible distance; and at a greater distance is converted into a repellent force, whereby the parts fly from each other. On this principle of attraction may we account for the cohesion of bodies otherwise inexplicable."

4
Formation
of particles
of different
sizes.

"The smallest particles may cohere by the strongest attractions, and compose bigger particles of weaker virtue; and many of these may cohere, and compose bigger particles, whose virtue is still less; and so on for divers successions, until the progression end in the biggest particles, on which the operations in chemistry, and the colours of natural bodies, depend; and which, by cohering, compose bodies of a sensible magnitude."

5
Distinction
of bodies
into hard,
soft, humid,
&c.

If the body is compact, and bends or yields inward to pressure without any sliding of its parts, it is hard and elastic; returning to its figure with a force arising from the mutual attraction of its parts. If the parts slide from one another, the body is malleable or soft. If they slip easily and are of a fit size to be agitated by heat, and the heat is great enough to keep them in agitation, the body is fluid; and if it be apt to stick to things, it is humid; and the drops of every fluid affect a round figure by the mutual attractions of their parts, as the globe of the earth and sea affects a round figure from the mutual attraction and gravity of its parts.

6
Existence
of repulsive
power pro-
ved.

"Since metals dissolved in acids attract but a small quantity of the acid, their attractive force reaches but to a small distance. Now, as in algebra, where affirmative quantities cease, their negative ones begin; so in mechanics, where attraction ceases, there a repulsive virtue must succeed. That there really is such a virtue seems to follow from the reflections and in-

flexion of the rays of light; the rays being repelled by bodies in both these cases without the immediate contact of the reflecting or inflecting body. The same thing seems also to follow from the emission of light; a ray, as soon as shaken off from a body by the vibrating motion of the parts of the body, and got beyond the reach of attraction, being driven away with exceeding great velocity; for that force which is sufficient to turn it back in reflection may be sufficient to emit it. From the same repelling power it seems to be that flies walk upon the water without wetting their feet; that the object glasses of long telescopes lie upon one another without touching; and that dry powders are difficultly made to touch one another so as to stick together, without melting them or wetting them with water, which, by exhaling, may bring them together."

"The particles of all hard homogeneous bodies which touch one another, cohere with a great force: to account for which, some philosophers have recourse to a kind of hooked atoms, which in effect is nothing else but to beg the question. Others imagine, that the particles of bodies are connected by rest, *i. e.* in effect by nothing at all; and others, by conspiring motions, *i. e.* by a relative rest among themselves. For myself, it rather appears to me, that the particles of bodies cohere by an attractive force, whereby they tend mutually to each other."

From this account of the formation and constitution of bodies, we can conclude nothing, except that they are composed of an infinite number of little particles, kept together by a force or power; but of what nature that power is, whether material or immaterial, we must remain ignorant till farther experiments are made. Some of the Newtonian philosophers, however, have positively determined those powers to be immaterial. In consequence of this supposition, they have so refined upon attractions and repulsions, that their systems seem not far from downright scepticism, or denying the existence of matter altogether. A system of this kind we find adopted by Dr Priestley*, from Messrs Boscovich and Michell, in order to solve some difficulties concerning the Newtonian doctrine of light. "The easiest method (says he) of solving all difficulties, is to adopt the hypothesis of Mr Boscovich, who supposes that matter is not impenetrable, as has been perhaps universally taken for granted; but that it consists of physical points only, endued with powers of attraction and repulsion in the same manner as solid matter is generally supposed to be: provided therefore that any body move with a sufficient degree of velocity, or have a sufficient *momentum* to overcome any powers of repulsion that it may meet with, it will find no difficulty in making its way through any body whatever; for nothing else will penetrate one another but powers, such as we know do in fact exist in the same place, and counterbalance or over-rule one another. The most obvious difficulty, and indeed almost the only one that attends this hypothesis, as it supposes the mutual penetrability of matter, arises from the idea of the nature of matter, and the difficulty we meet with in attempting to force two bodies into the same place. But it is demonstrable that the first obstruction arises from no actual contact of matter, but from mere powers of repulsion. This difficulty

7
No con-
clusion to
be drawn
from this
account.

* *Hist. of
Vision, vol. i.
p. 392.*
8
Mr Mi-
chell's hy-
pothesis a-
dopted by
Dr Priest-
ley.

9
Bodies op-
pose each
other not
from ac-
tual con-
tact.

culty

Cohesion. culty we can overcome; and having got within one sphere of repulsion, we fancy that we are now impeded by the solid matter itself. But the very same is the opinion of the generality of mankind with respect to the first obstruction. Why, therefore, may not the next be only another sphere of repulsion, which may only require a greater force than we can apply to overcome it, without disordering the arrangement of the constituent particles, but which may be overcome by a body moving with the amazing velocity of light?

10
Mr Baxter's opinion. "This scheme of the immateriality of matter, as it may be called, or rather the mutual penetration of matter, first occurred to Mr Michell on reading Baxter on the immateriality of the Soul. He found that this author's idea of matter was, that it consisted as it were of bricks cemented together with immaterial mortar. These bricks, he would be consistent with his own reasoning, were again composed of less bricks, cemented likewise by an immaterial mortar; and so on *ad infinitum*. This putting Mr Michell upon the consideration of the several appearances of nature, he began to perceive that the bricks were so covered with this immaterial mortar, that if they had any existence at all, it could not possibly be perceived; every effect being produced, in nine instances of ten certainly, and probably in the tenth also, by this immaterial, spiritual, and penetrable mortar. Instead therefore of placing the world upon the giant, the giant upon the tortoise, and the tortoise upon he could not tell what, he placed the world at once upon itself."

11
Cohesion supposed owing to elementary fire. Other philosophers have supposed the powers both of gravitation and cohesion to be material; and to be only different actions of the etherial fluid, or elementary fire. In support of this it hath been urged, that before we have recourse to a spiritual and immaterial power as the cause of any natural phenomenon, we ought to be well assured that there is no material substance with which we are acquainted, that is capable of producing such effects. In the present case, we are so far from having such assurance, that the contrary is manifest to our senses. One instance of this is in the experiment with the *Magdeburg hemispheres*, as they are called. These are two hollow hemispheres of brass, exactly fitted to one another, so as to form one globe when joined together, without admitting any air at the joining. In this state, if the air within them is exhausted by means of a pump, they will cohere with such force, if they are five or six inches diameter, as to require a weight of some hundreds of pounds to separate them. The pressure of the atmosphere, we see, is in this case capable of producing a very strong cohesion; and if there is in nature any fluid more penetrating, as well as more powerful in its effects, than the air we breathe, it is possible that what is called the *attraction of cohesion* may somehow or other be an effect of the action of that fluid. Such a fluid as this is the element of fire. Its activity is such as to penetrate all bodies whatever; and in the state in which it is commonly called *fire*, it acts according to the quantity of solid matter contained in the body. In this state, it is capable of dissolving the strongest cohesions observed in nature: but whatever is capable of dissolving any cohesion, must necessarily be endued with greater power than that by which the

cohesion is caused. Fire, therefore, being able to dissolve cohesions, must also be capable of causing them, provided its power is exerted for that purpose. Nor will it seem at all strange that this fluid should act in two such opposite ways, when we consider the different appearances which it assumes. These are three, *viz.* fire or heat, in which it consumes, destroys, and dissolves: light, in which it seems deprived of all destructive or dissolvent power, and to be the most mild, quiet, and placid being in nature. The third state of this element is, when it becomes what is called the *electric fluid*; and then it attracts, repels, and moves bodies, in a vast variety of ways, without either burning or rendering them visible by its light. In this state it is not less powerful than in either of the other two; for a violent shock of electricity will displace and tear in pieces the most heavy and solid bodies. The seeming capricious nature of this fluid, however, probably renders it less suspected as the cause of cohesion, than it otherwise would be, were the attractions regular and permanent, which we observe it to occasion. But here we must observe, that the fluid has an existence in all bodies before the experiments are tried which make its effects visible to us, and was acting in them according to its settled and established laws. While acting in this manner it was perfectly invisible; and all we can do is, to produce some little infringement of these regular laws according to which it commonly acts. In some cases, however, the electrical attractions produced by art are found to be pretty permanent and strong. Thus, Mr Symmer, in some experiments with silk stockings, found their attraction so strong, that it required upwards of 15 pounds weight to separate them from each other; and this attraction would continue for more than an hour. In plates of glass, too, he observed a remarkable cohesion when electrified. In the Philosophical Transactions for 1777, we find this hypothesis taken notice of, and in some measure adopted, by Mr Henry. "Some gentlemen (says he) have supposed that the electric matter is the cause of the cohesion of the particles of bodies. If the electric matter be, as I suspect, a real elementary fire inherent in all bodies, that opinion may probably be well founded; and perhaps the soldering of metals, and the cementation of iron, by fire, may be considered as strong proofs of the truth of their hypothesis."

On this last hypothesis we must observe, that if the electric, or any other fluid, is supposed to be the cause of the attraction of cohesion universally, the particles of that fluid must be destitute of all cohesion between themselves: otherwise we should be at as great a loss to account for the cohesion of these particles as for that of terrestrial matter. Philosophers, indeed, do not suppose any cohesion between the particles of the electric fluid themselves; it is generally believed that the particles of this fluid are repulsive of one another, though attracted by all other matter. If this is a fact, we cannot suppose the electric fluid to be the cause of cohesion. The probability or improbability of the hypothesis just mentioned, must greatly depend on its being ascertained whether the particles of the electric fluid do really repel one another, and attract all other kinds of matter, or not; but for this we must refer to the article **ELECTRICITY**.

COHOBATION, in chemistry, an operation by which

Cohesion,
Cohobation.

Cohorn
||
Coin.

which the same liquor is frequently distilled from the same body, either with an intention to dissolve this body, or to produce some change upon it. This is one of those operations which the ancient chemists practised with great patience and zeal, and which are now neglected. To make this operation easier, and to prevent the trouble of frequently changing the vessels, a particular kind of alembic, called a *pelican*, was invented. This vessel was made in the form of a cucurbit with an alembic-head, but had two spouts communicating with the body. As the vapour rose up into the head, it was gradually condensed, and ran down the spouts into the body of the pelican, from whence it was again distilled; and so on. This vessel is represented Plate CXXXIV, fig. 6.

COHORN (N.) the greatest engineer Holland has produced. Among his other works, which are esteemed master-pieces of skill, he fortified Bergen-op-zoom; which, to the surprise of all Europe, was taken by the French in 1747. He wrote a treatise on fortification; and died in 1704.

COHORT, in Roman antiquity, the name of part of the Roman legion, comprehending about 600 men. There were ten cohorts in a legion, the first of which exceeded all the rest both in dignity and number of men. When the army was ranged in order of battle, the first cohort took up the right of the first line; the rest followed in their natural order: so that the third was in the centre of the first line of the legion, and the fifth on the left; the second between the first and third; and the fourth between the third and fifth: the five remaining cohorts formed a second line in their natural order.

COIF, the badge of a serjeant at law, who is called serjeant of the coif, from the lawn coif they wear under their caps, when they are created serjeants.

The chief use of the coif was to cover the clerical tonsure. See TONSURE.

COILING, on shipboard, implies a sort of serpentine winding of a cable or other rope, that it may occupy a small space in the ship. Each of the windings of this sort is called a *fake*; and one range of fakes upon the same line is called a *tier*. There are generally from five to seven fakes in a tier; and three or four tiers in the whole length of a cable. This, however, depends on the extent of the fakes. The smaller ropes employed about the sails are coiled upon cleats at sea, to prevent their being entangled amongst one another in traversing, contracting, or extending the sails.

COILON, in the ancient Grecian theatres, the same with the cavea of the Romans.

COIMBRA, a handsome, large, and celebrated town of Portugal, capital of the province of Beira, with a bishop's see, and a famous university. The cathedral and the fountains are very magnificent. It is seated in a very pleasant country abounding in vineyards, olive-trees, and fruits. It stands on a mountain, by the side of the river Mondego. W. Long. 8. 57. N. Lat. 40. 10.

COIN, a piece of metal converted into money by the impressing of certain marks or figures thereon.

COIN differs from MONEY as the species from the genus. Money is any matter, whether metal, wood, leather, glass, horn, paper, fruits, shells, or kernels,

which have currency as a medium in COMMERCE. Coin. Coin is a particular species, always made of metal, and struck according to a certain process called COINING.

The precise epocha of the invention of money is too ancient for our annals; and, if we might argue from the necessity and obviousness of the thing, must be nearly coeval with the world.

Whether coins be of equal antiquity, may admit of some doubt; especially as most of the ancient writers are so frequent and express in their mention of leather-moneys, paper-moneys, wooden-moneys, &c. Some, however, notwithstanding this, are of opinion, that the first moneys were of metal: the reasons they give, are the firmness, neatness, cleanliness, durability, and universality of metals; which, however, do rather conclude they ought to have been so, than that they actually were so.

In effect, the very commodities themselves were the first moneys, *i. e.* were current for one another by way of exchange; and it was the difficulty of cutting or dividing certain commodities, and the impossibility of doing it without great loss, that first put men on the expedient of a general medium. See EXCHANGE.

Indeed, thus much may be said in behalf of coins, that, on this view, it was natural for men to have their first recourse to metals; as being almost the only things whose goodness, and as it were integrity, is not diminished by partition; besides the advantages above expressed, and the conveniences of melting and returning them into a mass, of any size or weight.

It was probably, then, this property of metals which first accustomed people, who trafficked together, to account them in lieu of quantities of other merchandizes in their exchanges, and at length to substitute them wholly in their stead; and thus arose money: as it was their other property to preserve any mark or impression a long time, which confirmed them in the right; and thus was the first rise of coins.

In the first ages, each person cut his metal into pieces of different sizes and forms, according to the quantity to be given for any merchandize, or according to the demand of the seller, or the quantity stipulated between them. To this end they went to market laden with metal in proportion to the purchase to be made, and furnished with instruments for portioning it, and scales for dealing it out, according as occasion required. By degrees, it was found more commodious to have pieces ready weighed; and as there were different weights required according to the value of the different wares, all those of the same weight began to be distinguished with the same mark or figure: thus were coins carried one step further. At length the growing commerce of money beginning to be disturbed with frauds, both in the weights and the matter, the public authority interposed; and hence the first stamps or impressions of money; to which succeeded the names of the monies; and at length the effigy of the prince, the date, legend, and other precautions to prevent the alterations of the species; and thus were coins completed.

Modern Coins. In England the current species of gold are the guinea, half-guinea, Jacobus, laureat, angel, and rose-noble; the four last of which are now seldom to be met with: having been most of them

con-

Coin. converted into guineas, chiefly during the reign of Charles II. and James II. The silver coins are the crown, half-crown, shilling, and sixpence. Copper coins are the half-penny and farthing.

In Scotland, by the articles of the Union, it is appointed that all the coins be reduced to the English, and the same accounts observed throughout. Till then the Scots had their pounds, shillings, and pence, as in England; but their pound was but 20 pence English, and the others in proportion: accordingly their merk was $13\frac{2}{3}$ s. Scots, current in England at $13\frac{1}{2}$ d. their noble in proportion. Besides these they had their turner-pence and half-pence; their penny $\frac{1}{12}$ of that of England: besides base money of achisons, babees, and placks. The bodle $\frac{1}{8}$ of the penny, $\frac{1}{4}$ of the achison, $\frac{1}{2}$ of the babee, and $\frac{1}{2}$ of the plack.

In Ireland, the coins are as in England, viz. shillings, pence, &c. with this difference, that their shilling is but equal to $11\frac{3}{4}$ d. Sterling: whence their pound is only 18s. $5\frac{1}{4}$ d.

But, for a view of all the coins presently current in the four quarters of the globe, with their values and proportions, see the table subjoined to the article MONEY.

In many places shells are current for coins ; particularly a small white kind dug out of the ground in the Maldives, and some parts of America, called in the Indies *cowries* or *coris*, on the coast of Africa *bonges*, and in America *porcelaines* ; of which it takes a vast number to be equivalent in value to a penny. Of zim-bis, another kind of shell current, particularly in the kingdoms of Angola and Congo, two thousand make what the negroes call a *macoute* ; which is no real money ; for of this there is none in this part of Africa but a manner of reckoning : thus, two Flemish knives they esteem a *macoute* ; a copper-bason two pounds weight, and 12 inches diameter, they reckon three *macoutes* ; a fufee 10, &c.

In some places fruits are current for coins. Of these there are three sorts used; two in America, particularly among the Mexicans, which are the cacao and maize; the other in the East Indies, *viz.* almonds brought thither from Lar, and growing in the desarts of Arabia. Of cacao 15 are esteemed equivalent to a Spanish rial, or seven pence sterling. Maize has ceased to be a common money since the discovery of America by the Europeans. Almonds are chiefly used where the *cowries* are not current. As the year proves more or less favourable to this fruit, the value of the money is higher or lower. In a common year 40 almonds are set against a *pescha*, or half-penny sterling; which brings each almond to $\frac{1}{10}$ of a farthing.

Ancient COINS are those chiefly which have been current among the Jews, Greeks, and Romans. Their values and proportions are as follows.

JEWISH.				l.	s.	d.	fler.
Gerah	10	Becah		0	0	1	$\frac{57}{80}$
	20	2 Shekel		0	0	1	$\frac{11}{10}$
1200	120	50	Maneh	0	0	2	$\frac{3}{8}$
			Mina hebraica }	5	14	0	$\frac{1}{4}$
60000	6000	1000	60 Talent	342	3	9	
Solidus aureus, or sextula, worth				0	12	0	$\frac{1}{2}$
Siclus aureus, worth				1	16	6	
A talent of gold, worth				5475	0	0	

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GRECIAN.

Lepton										0	0	0	$\frac{1}{10}$
7	Chalcus									0	0	0	$\frac{1}{10}$
14	2	Dichalcus								0	0	0	$\frac{1}{5}$
28	4	2	Hemiobolus							0	0	1	$\frac{2}{5}$
56	8	4	2	Obolus						0	1	1	$\frac{3}{5}$
112	16	8	4	2	Diobolus					0	2	2	$\frac{4}{5}$
224	32	16	8	4	2	Tetrobolus				0	5	0	$\frac{1}{2}$
336	48	24	12	6	3	$1\frac{1}{2}$	Drachma			0	7	3	
662	96	48	24	12	6	3	2	Didrachmon		1	3	2	
1324	112	96	48	24	12	6	4	2	Tetrad stater	2	7	0	
1660	384	120	60	30	15	7 $\frac{1}{2}$	5	2 $\frac{1}{2}$	1 $\frac{1}{4}$	Pentrad.	3	2	3

Note: Of these the drachma, didrachm, &c. were of silver, the rest for the most part of brass. The other parts, as tridrachm, triobolus, &c. were sometimes coined.

Note also: The drachma is here, with the generality of authors, supposed equal to the denarius; though there is reason to believe that the drachma was somewhat the weightier. See DRACHMA and DENARIUS.

l. s. d. Sterl.

The Grecian gold coin was the stater aureus, weighing two attic drachms, or half of the stater argenteus; and exchanging usually for 25 attic drachms of silver; in our money

According to our proportion of
gold to silver —

There were likewise the stater
cycizenus, exchanging for 28 attic
drachms, or ———

Stater philippicus, and stater alexandrinus, of the same value.

Stater darcus, according to Josephus, worth 50 attic drachms,
or ————

Stater cræsius, of the same value.

ROMAN.

Teruncius				—	—	○	○	$0\frac{775}{1000}$
2	Semilibella			—		○	○	$1\frac{55}{100}$
4	2	Libella		}	—	○	○	$3\frac{1}{10}$
		As						
10	5	$2\frac{1}{2}$	Sestertius		—	○	1	$3\frac{3}{4}$
20	10	5	2	Quinarius	}	○	3	$3\frac{1}{2}$
				Victoriatus				
40	20	10	4	2	Denarius	○	7	3

Note : Of these the denarius, victoriatuſ, ſeſtertius, and ſometimes the aſ, were of ſilver, the reſt of braſs. See Aſ, &c.

There were sometimes also coined of brass the triens, sextans, uncia, sextula, and dupondius.

The Roman gold coin was the aureus, which weighed generally double the denarius; the value of which, according to the first proportion of coinage, mentioned by Pliny, was —

According to the proportion that obtains now amongst us, worth

R

Ac-

Coin,
Coinage.

According to the decuple proportion, mentioned by Livy and Julius Pollux, worth

l. s. d.
o 12 11

According to the proportion mentioned by Tacitus, and which afterwards obtained, whereby the aureus exchanged for 25 denarii, its value

o 16 11

COIN, in architecture, a kind of dye cut diagonal-wise, after the manner of a flight of a stair-case, serving at bottom to support columns in a level, and at top to correct the inclination of an entablature supporting a vault.

COIN is also used for a solid angle composed of two surfaces inclined towards each other, whether that angle be exterior, as the coin of a wall, a tree, &c. or interior, as the coin of a chamber or chimney. See QUOIN.

COINAGE, or COINING, the art of making money, as performed either by the hammer or mill.

Formerly the fabric of coins was different from what it is at present. They cut a large plate of metal into several little squares, the corners of which were cut off with sheers. After having shaped these pieces, so as to render them perfectly conformable, in point of weight, to the standard piece, they took each piece in hand again, to make it exactly round by a gentle hammering. This was called a *planchet*, and was fit for immediate coining. Then engravers prepared, as they still do, a couple of steel masses in form of dyes, cut and terminated by a flat surface, rounded off at the edges. They engraved or stamped on it the hollow of a head, a cross, a scutcheon, or any other figure, according to the custom of the times, with a short legend. As one of these dyes was to remain dormant, and the other moveable, the former ended in a square prism, that it might be introduced into the square hole of the block, which, being fixed very fast, kept the dye as steady as any vice could have done. The planchet of metal was horizontally laid upon this inferior mass, to receive the stamp of it on one side, and that of the upper dye, wherewith it was covered, on the other. This moveable dye, having its round engraved surface resting upon the planchet, had at its opposite extremity a flat square, and larger surface, upon which they gave several heavy blows, with a hammer of an enormous size, till the double stamp was sufficiently in relief, impressed on each side of the planchet. This being finished, was immediately succeeded by another, and they thus became a standard coin, which had the degree of fineness of the weight and mark determined by the judgment of the inspectors, to make it good current money. The strong tempering which was and is still given to the two dyes, rendering them capable of bearing those repeated blows. Coining has been considerably improved and rendered expeditious, by several ingenious machines, and by a wise application of the surest physical experiments to the methods of fining, dyeing, and stamping the different metals.

The three finest instruments the mint-man uses, are the laminating engine; the machine for making the impressions on the edges of coins; and the mill.

After they have taken the laminæ, or plates of me-

tal, out of the mould into which they are cast, they do not beat them on the anvil, as was formerly done, but they make them pass and repass between the several rollers of the laminating engine, which being gradually brought closer and closer to each other, presently give the lamina its uniform and exact thickness. Instead of dividing the lamina into small squares, they at once cut clean out of it as many planchets as it can contain, by means of a sharp steel trepan, of a roundish figure, hollow within, and of a proportionable diameter, to shape and cut off the piece at one and the same time. After these planchets have been prepared and weighed with standard pieces, filed or scraped to get off the superfluous part of the metal, and then boiled and made clean, they arrive, at last, at the machine (fig. 1.), which marks them upon the edge; and finally, the mill (fig. 2.), which, squeezing each of them singly between the two dyes, brought near each other with one blow, forces the two surfaces or fields of the piece to fill exactly all the vacancies of the two figures engraved hollow. The engine which serves to laminate lead, gives a sufficient notion of that which serves to flatten gold and silver laminæ between rollers of a lesser size.

The principal pieces of the machine (fig. 1.), to stamp coins on the edge, are two steel laminæ, about a line thick. One half of the legend, or of the ring, is engraved on the thickness of one of the laminæ, and the other half on the thickness of the other; and these two laminæ are straight, although the planchet marked with them be circular.

When they stamp a planchet, they first put it between the laminæ in such a manner, as that these being each of them laid flat upon a copper-plate, which is fastened upon a very thick wooden table, and the planchet being likewise laid flat upon the same plate, the edge of the planchet may touch the two laminæ on each side, and in their thick part.

One of these laminæ is immoveable, and fastened with several screws; the other slides by means of a dented wheel, which takes into the teeth that are on the surface of the lamina. This sliding lamina makes the planchet turn in such a manner, that it remains stamped on the edge, when it has made one turn. Only crown and half crown pieces can bear the impression of letters on the thickness of their edges.

The coining engine or mill is so handy (fig. 2.), that a single man may stamp twenty thousand planchets in one day: gold, silver, and copper planchets, are all of them coined with a mill, to which the coining squares (fig. 3.), commonly called dyes, are fastened; that of the face under, in a square box garnished with male and female screws, to fix and keep it steady; and the other above, in a little box garnished with the same screws, to fasten the coining square. The planchet is laid flat on the square of the effigy, which is dormant; and they immediately pull the bar of the mill by its cords, which causes the screw-set within it to turn. This enters into the female screw, which is in the body of the mill, and turns with so much strength, that by pushing the upper square upon that of the effigy, the planchet, violently pressed between both squares, receives the impression of both at one pull, and in the twinkling of an eye.

Coinage.

Plate
CXLIV.

The

Coining.

The planchet thus stamp'd and coined, goes through a final examination of the mint wardens, from whose hands it goes into the world.

In the *COINING of Medals*, the process is the same, in effect, with that of money; the principal difference consisting in this, that money having but a small relief, receives its impression at a single stroke of the engine; whereas for medals, the height of their relief makes it necessary that the stroke be repeated several times: to this end the piece is taken out from between the dyes, heated, and returned again; which process, in medallions and large medals, is repeated fifteen or twenty times before the full impression be given: care must be taken, every time the planchet is removed, to take off the superfluous metal stretched beyond the circumference with a file. Medallions, and medals of a high relief, are usually first cast in sand, by reason of the difficulty of stamping them in the press, where they are put only to perfect them; in regard the sand does not leave them clear, smooth, and accurate enough. Therefore we may see that medals receive their form and impression by degrees, whereas money receives them all at once.

British COINAGE, both by the beauty of the engraving, and by the invention of the impressions on the edges, that admirable expedient for preventing the alteration of the species, is carried to the utmost perfection.

It was only in the reign of king William III. that the hammer-money ceased to be current in England, where till then it was struck in that manner, as in other nations. Before the hammer species was called in, the English money was in a wretched condition, having been filed and clipped by natives as well as foreigners, insomuch that it was scarce left of half the value: the retrieving this distressed state of the English money is looked upon as one of the glories of king William's reign.

The British coinage is now wholly performed in the Tower of London, where there is a corporation for it, under the title of the *mint*. Formerly there were here, as there are still in other countries, the rights of seignorage and brassage: but since the eighteenth year of king Charles II. there is nothing taken either for the king or for the expences of coining; so that weight is returned for weight, to any person who carries their gold and silver to the Tower.

The species coined in Great Britain are esteemed contraband goods, and not to be exported. All foreign species are allowed to be sent out of the realm, as well as gold and silver in bars, ingots, dust, &c.

Barbary COINAGE, particularly that of Fez and Tunis, is under no proper regulations, as every goldsmith, Jew, or even private person, undertakes it at pleasure; which practice renders their money exceeding bad, and their commerce very unsafe.

Muscovite COINAGE. In Muscovy there is no other coin struck but silver, and that only in the cities of Moscow, Novogrod, Twere, and Pleskow, to which may be added Petersburg. The coinage of each of these cities is let out to farm, and makes part of the royal revenue.

Persian COINAGE. All the money made in Persia is struck with a hammer, as is that of the rest of Asia; and the same may be understood of America, and the

coasts of Africa, and even Muscovy: the king's duty, in Persia, is seven and a half *per cent.* for all the moneys coined, which are lately reduced to silver and copper, there being no gold coin there except a kind of medals, at the accession of a new sopher.

Spanish COINAGE is esteemed one of the least perfect in Europe. It is settled at Seville and Segovia, the only cities where gold and silver are struck.

COIRE, or, as the Germans call it, CHUR, a large and handsome town of Switzerland, and capital of the country of the Grisons, with a bishop's see, whose prelate has the right of coining money. It is divided into two parts; the least of which is of the Roman Catholic religion, and the greatest of the Protestant. It is governed by its own laws, and seated in a plain, abounding in vineyards and game, on the river Plessure, half a mile from the Rhine. E. Long. 9. 27. N. Lat. 46. 50.

COITION, the intercourse between male and female in the act of generation.

It is observed that frogs are 40 days in the act of coition. Bartholine, &c. relate, that butterflies make 130 vibrations of the wings in one act of coition.

COIX, JOBS-TEARS: A genus of the triandria order, belonging to the monœcia class of plants; and in the natural method ranking under the 4th order, *Gramina*. The male flowers grow in spikes remote from one another; the calyx is a biflorous, beardless glume. The calyx of the female is a biflorous glume; the corolla a beardless glume; the style bipartite; the seed covered with the calyx ossified. Of this there is but one species, a native of the Archipelago islands, and frequently cultivated in Spain and Portugal, and also in the West Indies. It is an annual plant, rising from a fibrous root, with two or three jointed stalks, to the height of two feet, with single, long, narrow leaves at each joint, resembling those of the reed; at the base of the leaves come out the spikes of flowers standing on short footstalks; the seeds greatly resemble those of gromwell; whence the plant has by some writers been called *lithospermum*. This plant may be propagated in this country by seeds brought from Portugal, and sown on a hot-bed; after which the young plants are to be removed into a warm border, and planted at the distance of two feet at least from each other. They will require no other care than to be kept free from weeds. In Spain and Portugal the poor people grind the seeds of this plant, in times of scarcity, and make a coarse kind of bread of them. The seeds are inclosed in small capsules about the bigness of an English pea, and of different colours. These are strung upon silk, and used instead of bracelets by some of the poorer sort in the West Indies, but especially by the negroes.

COKE, or COOKE (Sir Edward), lord chief justice of the king's bench in the reign of James I. was descended from an ancient family in Norfolk, and born at Milcham in 1549. When he was a student in the Inner-Temple, the first occasion of his distinguishing himself was the stating the case of a cook belonging to the Temple so exactly, that all the house, who were puzzled with it, admired him and his pleading, and the whole bench took notice of him. After his marriage with a lady of a great fortune, preferments flowed in upon him. The cities of Norwich and Coventry chose him for their recorder; the county of Norfolk, for

Coinage
||
Coke.

Coke
||
Colberg.

one of their knights in parliament; and the house of commons, for their speaker, in the 35th year of queen Elizabeth. The queen appointed him solicitor-general in 1592, and attorney-general the next year. In 1603, he was knighted by king James I; and in November the same year, upon the trial of Sir Walter Raleigh, &c. at Winchester, he treated that gentleman with a scurrility of language hardly to be paralleled. June 27. he was appointed lord chief justice of the common pleas; and in 1613, lord chief justice of the king's bench, and sworn one of the privy council. In 1615, he was very vigorous in the discovery and prosecution of the persons employed in poisoning Sir Thomas Overbury in the Tower in 1612. His contest not long after with the lord chancellor Egeton, with some other cases, hastened the ruin of his interest at court; so that he was sequestered from the council-table and the office of lord chief justice. In 1621, he vigorously maintained in the house of commons, that no proclamation is of any force against the parliament. The same year, being looked upon as one of the great incendiaries in the house of commons, he was removed from the council of state with disgrace; the king saying, that "he was the fittest instrument for a tyrant that ever was in England:" he was also committed to the Tower, and his papers were seized. Upon the calling of a new parliament in 1625, the court party, to prevent his being elected a member, got him appointed sheriff of Buckinghamshire; to avoid the office, if possible, he drew up exceptions against the oath of a sheriff, but was obliged to undertake the office. In 1628, he spoke vigorously upon grievances; and made a speech in which he affirmed, that "the Duke of Buckingham was the cause of all our miseries." While he lay upon his death-bed, his papers and last will were seized by an order of council. He died in 1634, and published many works: the most remarkable are his Institutes of the laws of England; the first part of which is only a translation and comment of Sir Thomas Littleton, one of the chief justices of the common pleas in the reign of Edward IV.

COKENHAUSEN, a strong town of Livonia in Sweden, on the river Divina. E. Long. 24. 26. N. Lat. 56. 40.

COL, a name given by some to one of the western islands of Scotland; it abounds in corn, pasture, salmon, eels, and cod. W. Long. 7. 35. N. Lat. 57.

COLAPIS, COLOPS (anc. geog.), a river of Liburnia, which after a winding north-east course, falls into the Savus, at the Insula Segestica. Now the *Culpe*, the boundary of the Alps, running through Croatia into the Save. Colapiani, the people living on it (Pliny).

COLARBASIANS, or COLORBASIANS, a set of Christians in the second century; so called from their leader Colarbasus, a disciple of Valentinus; who, with Marcus, another disciple of the same master, maintained the whole plenitude, and perfection, of truth and religion, to be contained in the Greek alphabet: and that it was upon this account that Jesus Christ was called the *alpha* and *omega*. This sect was a branch of the Valentinians. See also MARCOSIANS.

COLBERG, a strong, handsome sea-port town of Germany, in Pomerania, belonging to the king of Prussia. It is remarkable for its salt-works; and is

seated at the mouth of the river Persant, on the Baltic sea, 60 miles north-east of Stetin, and 30 north-east of Camin. E. Long. 15. 57. N. Lat. 54. 18.

COLBERT (JOHN BAPTIST), marquis of Segnelai, one of the greatest statesmen that France ever had, was born at Paris in 1619; and descended from a family that lived at Rheims in Champagne, no way considerable for its splendor and antiquity. His grandfather is said to have been a wine-merchant, and his father at first followed the same occupation; but afterwards traded in cloth, and at last in silk. Our Colbert was instructed in the arts of merchandize; and afterwards became clerk to a notary. In 1648, his relation John Baptist Colbert, lord of S. Pouange, preferred him to the service of Michael Le Tellier, secretary of state, whose sister he had married; and here he discovered such diligence and exactness in executing all the commissions that were entrusted to his care, that he quickly grew distinguished. One day his master sent him to Cardinal Mazarine, who was then at Sedan, with a letter written by the queen mother; and ordered him to bring it back, after that minister had seen it. Colbert carried the letter, and would not return without it, though the cardinal treated him roughly, used several arts to deceive him, and obliged him to wait for it several days. Some time after, the cardinal returning to court, and wanting one to write his agenda or memoranda, desired Le Tellier to furnish him with a fit person for that employment: and Colbert being presented to him, the cardinal had some remembrance of him, and desired to know where he had seen him. Colbert was afraid of putting him in mind of Sedan, lest the remembrance of his importunacy, in demanding the queen's letter, should renew the cardinal's anger. But his eminency was so far from hating him for his faithfulness to his late master, that he received him on condition that he should serve him with the like zeal and fidelity.

Colbert applied himself wholly to the advancement of his master's interests, and gave him so many marks of his diligence and skill, that afterwards he made him his intendant. He accommodated himself so dexterously to the inclinations of that minister, by retrenching his superfluous expences, that he was entrusted with the management of that gainful trade of selling benefices and governments. It was by Colbert's counsel, that the cardinal obliged the governors of frontier places to maintain their garrisons with the contributions they exacted; with which advice his eminency was extremely pleased. He was sent to Rome, to negotiate the reconciliation of cardinal de Rets, for which the Pope had showed some concern; and to persuade his holiness to consent to the disincamerating of Casto, according to the treaty concluded with his predecessor Urban VIII. Upon the whole, Mazarine had so high an opinion of Colbert's abilities, and withal such a regard for his faithful services, that at his death, which happened in 1661, he earnestly recommended him to Louis XIV. as the properest person to regulate the finances, which at that time stood in much need of reformation. Louis accepted the recommendation, and made Colbert intendant of the finances. He applied himself to their regulation, and succeeded: though it procured him many enemies, and some affronts. France is also obliged

Colbert.

Colbert. obliged to this minister for establishing at that time her trade with the East and West Indies: a great design, and from which she has reaped innumerable advantages.

In 1664, he became superintendant of the buildings; and for that time applied himself so earnestly to the enlarging and adorning of the royal edifices, that they are at present so many master-pieces of architecture: witness the palace of the Thuilleries, the Louvre, St Germain, Fontainebleau, and Chombord. As for Versailles, it may be said that he raised it from the ground. It was formerly a dog-kennel, where Louis XIII. kept his hunting furniture: it is now a palace fit for the greatest monarch. But royal palaces were not Colbert's only care: he formed several designs for increasing the beauty and convenience of the capital city, and he did it with great magnificence and grandeur. The public was obliged to this same minister for the establishment of the academy for painting and sculpture in 1664. The king's painters and sculptors, with other skilful professors of those arts, being prosecuted at law by the master-painters at Paris, joined together; and began to form a society, under the name of the Royal Academy for Sculpture and Painting. Their design was to keep public exercises, for the sake of improving those fine arts, and advancing them to the highest degree of perfection. They put themselves under the protection of Mazarine, and chose chancellor Seguier their vice-protector; and after Mazarine's death, chose Seguier their protector, and Colbert their vice protector. It was at his solicitation that they were finally established by a patent, containing new privileges, in 1664. Colbert, being made protector after the death of Seguier, thought fit that an historiographer should be appointed, whose business it should be to collect all curious and useful observations that should be made at their conferences. This was accordingly done; and his majesty was pleased to settle on him a salary of 300 livres. To Colbert also the lovers of naval knowledge are obliged for the erection of the Academy of Sciences: for the making of which the more useful, he caused to be erected, in 1667, the royal observatory at Paris, which was first inhabited by Cassini. But these are not the only obligations France has to that minister: she owes to him all the advantages she receives by the union of the two seas; a prodigious work, begun in 1666 and finished in 1680. Colbert was also very intent upon matters of a more private nature, such as regarded the order, decency, and well being of society. He undertook to reform the courts of justice, and to put a stop to the usurpation of noble titles; which it seems was then very common in France. In the former of those attempts he failed, in the latter he succeeded.

In 1669, he was made secretary of state, and entrusted with the management of affairs relating to the sea: and his performances in this province were answerable to the confidence his majesty reposed in him. He suppressed several offices, which were chargeable, but useless: and in the mean time, perceiving the king's zeal for the extirpation of heresy, he shut up the chamber instituted by the edicts of Paris and Roan. He proposed several new regulations concerning criminal courts; and was extremely severe with the parliament of Tholouse for obstructing the measures he

took to carry the same into execution. His main design in reforming the tedious methods of proceeding at law, was to give the people more leisure to apply themselves to trading: for the advancement of which he procured an edict, to erect a general insurance-office at Paris, for merchants, &c. In 1672 he was made minister of state: for how busied soever he was in the regulation of public affairs, yet he never neglected his own or his family's interest and grandeur, or missed any opportunity of advancing either. He had been married many years, had sons and daughters grown up; all of which, as occasion served, he took care to marry to great persons. For though he had no reason to doubt of his master's favour, yet he wisely secured his fortune by powerful alliances. However, business was certainly Colbert's natural turn; and he not only loved it, but was very impatient to be interrupted in it, as the following anecdote may serve to show. A lady of great quality was one day urging him, when he was in the height of his power, to do her some piece of service; and perceiving him inattentive and inflexible, threw herself at his feet, in the presence of above 100 persons, crying, "I beg your greatness, in the name of God, to grant me this favour." Upon which Colbert, kneeling down over against her, replied, in the same mournful tone, "I conjure you, madam, in the name of God, not to disturb me."

This great minister died of the stone, September 6. 1683, in his 65th year; leaving behind him six sons and three daughters. He was of a middle stature, rather lean than fat. His mien was low and dejected, his air gloomy, and his aspect stern. He slept little, and was very sober. Though naturally sour and morose, he knew how to act the lover, and had mistresses. He was of a slow conception, but spoke judiciously of every thing after he had once comprehended it. He understood business perfectly well, and he pursued it with unwearied application. Thus he filled the most important places with high reputation and credit; and his influence diffused itself through every part of the government. He restored the finances, the navy, the commerce: and he erected those various works of art, which have ever since been monuments of his taste and magnificence. He was a lover of learning, though he never applied to it himself; and therefore conferred donations and pensions upon scholars in other countries, while he established and protected academies in his own. He invited into France painters, statuarys, mathematicians, and artists of all kinds, who were any way eminent: thus giving new life to the sciences, and making them flourish, as they did, exceedingly. Upon the whole, he was a wise, active, generous-spirited minister; ever attentive to the interests of his master, the happiness of the people, the progress of arts and manufactures, and in short to every thing that could advance the credit and interest of his country. He was a pattern for all ministers of state; and every nation may wish themselves blessed with a Colbert.

COLCHESTER, the capital of the county of Essex in England. It is by some thought to be the place mentioned by Antoninus under the name of *Colonia*, different from *Colonia Camaloduni*, and by the Saxons called *Caer Colin*. It is a beautiful, populous, and pleasant town, extending on the brow of a hill from east

Colbert,
Colchester.

Colchi,
Colchicum.

east to west, and adorned with 10 churches. It had formerly strong walls and a castle, but now there are scarce any remains of either. This place is said to have given birth to Fl. Julia Helena, mother to Constantine the Great, and daughter to King Coelus, so much celebrated for her piety and zeal in propagating the Christian religion. Here, and in the neighbouring towns, is a great manufacture of bays and says. It is also famous for its oysters; in pickling and barrel-ling which the inhabitants excel. The rendering navigable the river Coln, on which the town stands, has greatly promoted its trade and manufactures. The town had formerly an abbey whose abbot was mitred and sat in parliament. In the time of the civil wars it was besieged by the parliament's troops and reduced by famine. It was formerly a corporation, but lately lost its charter for some misdemeanor; however, it still sends two members to parliament. E. Long. 1. 2. N. Lat. 51. 55.

COLCHI (Arrian, Ptolemy), a town of the Hither India; thought to be *Cochin*, on the coast of Malabar; now a factory and strong fort of the Dutch. E. Long. 75. 0. N. Lat. 10. 0.

COLCHICUM, MEADOW-SAFFRON: A genus of the trigynia order, belonging to the hexandria class of plants; and in the natural method ranking under the ninth order, *Spathaceae*. The corolla is sexpartite, with its tube radicated, or having its root in the ground; there are three capsules, connected and inflated. There are three species, all of them bulbous-rooted, low, perennials, possessing the singular property of their leaves appearing at one time, and their flowers at another; the former rising long and narrow from the root in the spring, and decaying in June; the flowers, which are monopetalous, long, tubular erect, and six-parted, rise naked from the root in autumn, not more than four or five inches high. Their colours afford a beautiful variety; being purple, variegated purple, white, red, rose-coloured, yellow, &c. with single and double flowers. They are all hardy plants, insomuch that they will flower though the roots happen to lie out of the ground; but by this they are much weakened. They are propagated by offsets from the roots, of which they are very prolific. These are to be taken up and divided at the decay of the leaf in summer, planting the whole again before the middle of August. They are to be placed at nine inches distance from one another, and three inches deep in the ground.

The root of this plant is poisonous. When young and full of sap, its taste is very acrid; but when old, mealy and faint. Two drachms of it killed a large dog in 13 hours, operating violently by stool, vomit, and urine. One grain of it swallowed by a healthy man, produced heats in the stomach, and soon after flushing heats in different parts of the body, with frequent shiverings, followed by colicky pains; after which an itching in the loins and urinary passages was perceived; then came on a continual inclination to make water, a tenesmus, pain in the head, quick pulse, thirst, and other disagreeable symptoms. Notwithstanding these effects, however, an infusion of the roots in vinegar, formed into a syrup with honey of sugar, proves a safe and powerful pectoral and diuretic, and is often of

service in dropfies, &c. The virtues of colchicum seem much to resemble those of squills. The hermodactyl of the shops is said to be the root of the variegatum, a species of this genus.

COLCHIS, a country of Asia, at the south of Asiatic Sarmatia, east of the Euxine Sea, north of Armenia, and west of Iberia. It is famous for the expedition of the Argonauts, and as the birth-place of Medea. It was fruitful in poisonous herbs, and produced excellent flax. The inhabitants were originally Egyptians, who settled there when Sesostris king of Egypt extended his conquests in the north.

COLCOTHAR, the substance remaining after the distillation or calcination of martial vitriol by a violent fire. See CHEMISTRY, n° 621.

COLD, in a relative sense, signifies the sensation ¹ Definition, which accompanies a transition of the fine vessels of the human body from an expanded to a more contracted state. In an absolute sense, it signifies the cause of this transition; or, in general, the cause of the contraction of every substance, whether solid or fluid, in nature.

The argument concerning the substance of cold in ² Cold tends the abstract, are discussed under the article CHEMISTRY, to make bo- to which we must at present refer the reader. In that ³ dies elec- article it is observed, that cold naturally tends to make tric. bodies electric which are not so naturally, and to increase the electric properties of those which are: and in confirmation of the hypothesis there advanced, it may be observed, that all bodies do not transmit cold equally well; but that the best conductors of electricity, viz. metals, are likewise the best conductors of cold. We ³ Bodies ren- may also add, that when the cold has been carried to dered elec- such an extremity as to render any body an electric, tric by cold, it then ceases to conduct the cold as well as formerly. ⁴ Why cold cannot in- This is exemplified in the practice of the Laplanders, crease itself like heat. and Siberians, where the cold in winter is extremely severe. In order to exclude it from their habitations the more effectually, they cut pieces of ice, which in the winter time must always be electric in these countries, and put them into their windows; which they find to be much more effectual in keeping out the cold than any other substance.

Cold, as well as heat, may be produced artificially, ⁴ Why cold though we have no method of making cold increase it- cannot in- self as heat will do. The reason of this easily appears crease itself like heat. from what is said on the subject of cold under the article CHEMISTRY: for if this consists in a partial cessation of motion in the elementary fluid, it is plain, that though we may partly put an end to this motion in a very small part of it; yet that of the surrounding atmosphere extending for an immense way farther than we can extend our influence, will quickly counteract our operations, and reduce the bodies to the same temperature they were of before. Though there are therefore some liquids which by mixture will produce considerable degrees of cold; yet by being left to the action of the surrounding warm atmosphere, the heat is quickly communicated from it to them, and the effect of the mixture ceases. The case is very different with heat; for this fluid, of itself naturally very much inclined to motion, no sooner finds an opportunity of exerting its action, than vast quantities of what was formerly at rest rush from all quarters to the place where

Colchin
Cold.

Cold. where the action has commenced, and continue it until the equilibrium is restored, as is particularly explained under the article CHEMISTRY.

5
Degrees of cold produced by various saline mixtures. The power of producing cold belongs particularly to bodies of the saline class. In a paper of the Philosophical Transactions, N^o 274, Mr Geoffroy gives an account of some remarkable experiments with regard to the production of cold. Four ounces of sal ammoniac dissolved in a pint of water, made his thermometer descend two inches and three quarters in less than fifteen minutes. An ounce of the same salt put into four or five ounces of distilled water, made the thermometer descend two inches and a quarter. Half an ounce of sal ammoniac mixed with three ounces of spirit of nitre, made the thermometer descend two inches and five lines; but on using spirit of vitriol instead of nitre, it sunk two inches and six lines. In this last experiment it was remarked, that the vapours raised from the mixture had a considerable degree of heat, though the liquid itself was so extremely cold. Four ounces of saltpetre mixed with a pint of water, sunk the thermometer one inch three lines; but a like quantity of sea-salt sunk it only two lines. Acids always produced heat, even common salt with its own spirit. Volatile alkaline salts produced cold in proportion to their purity, but fixed alkalies heat.

The greatest degree of cold produced by the mixture of salts and aqueous fluids was that shown by M. Homberg; who gives the following receipt for making the experiment: "Take a pound of corrosive sublimate, and as much sal ammoniac; powder them separately, and mix the powders very exactly; put the mixture into a vial, pouring upon it a pint and a half of distilled vinegar, shaking all well together." This composition grows so cold, that a man can scarce hold it in his hands in summer; and it happened, as M. Homberg was making the experiment, that the subject froze. The same thing once happened to M. Geoffroy in making an experiment with sal ammoniac and water, but it never was in his power to make it succeed a second time.

6
Of mixtures with ice and snow. If, instead of making these experiments, however, with fluid water, we take it in its congealed state of ice, or rather snow, degrees of cold will be produced vastly superior to any we have yet mentioned. A mixture of snow and common salt sinks Fahrenheit's thermometer to 0; potashes and powdered ice sink it eight degrees farther; two affusions of spirit of salt on pounded ice sunk it below $14\frac{1}{2}^{\circ}$ below 0; but by repeated affusions of spirit of nitre, Mr Fahrenheit sunk it to 40° below 0. This is the ultimate degree of cold which the mercurial thermometer will measure: because the mercury itself begins then to congeal; and therefore we must afterwards have recourse to spirit of wine, naphtha, or some other fluid which will not congeal. The greatest degree of cold hitherto producible by artificial means has been 80° below 0; which was done at Hudson's Bay by means of snow and vitriolic acid, the thermometer standing naturally at 20° below 0. Greater degrees of cold than this have indeed been supposed. Mr Martin, in his Treatise on Heat, relates, that at Kirenga in Siberia, the mercurial thermometer sunk to 118° below 0; and Professor Brown at Petersburg, when he made the first experiment of congealing quicksilver, fixed the point of congelation at 350°

below 0; but Dr Black, as soon as the experiment was made known in this country, observed, that in all probability the point of congelation was far above this. His reasons for supposing this to be the case were, that the mercury descended regularly only to a certain point, after which it would descend suddenly and by starts 100 degrees at a time. This, he conjectured, might proceed from the irregular contraction of the metal after it was congealed; and he observed, that there was one thermometer employed in the experiment which was not frozen, and which did not descend so low by a great many degrees. Experience has since verified his conjecture; and it is now generally known, that 40° below 0 is the freezing point of quicksilver.

Since the discovery of the possibility of producing cold by artificial means, various experiments have been made on the efficacy of saline substances in this way; all of which, when properly applied, are found to have a considerable degree of power. Dr Boerhaave found, that both sal ammoniac and nitre, when well dried in a crucible, and reduced to fine powder, will produce a greater degree of cold than if they had not been treated in this manner. His experiments were repeated by Mr Walker apothecary to the Redcliffe Infirmary in Oxford with the same result: but he found, that his thermometer sunk 32° by means of a solution of sal ammoniac; when Boerhaave's, with the same, fell only 28° . Nitre sunk it 19° . On mixing the two salts together, he found that the power of producing cold was considerably increased. By equal parts of these salts, he cooled some water to 22° , the thermometer standing at 47° in the open air. Adding to this some powder of the same kind, and immersing two small phials in the mixture, one containing boiled and the other unboiled water, he soon found them both frozen, the unboiled water freezing first.

Having observed that Glauber's salt, when it retains the water of crystallization, produces cold during its solution, he tried its power when mixed with the other salts, and thus sunk the thermometer from 65° to 19° ; and thus he was able to freeze water when the thermometer stood as high as 70° . And, lastly, by first cooling the salts in water in one mixture, and then making another of the cooled thermometers, he was able to sink the thermometer 64° . Thus he froze a mixture of spirit of wine and water in the proportion of seven of the latter to one of the former; and by adding a quantity of cooled materials to the mixture in which this was frozen, the thermometer sunk to -4 , or 69° . Spirit of nitre diluted with water reduced the thermometer to -3 ; and, by the addition of sal ammoniac, to -15 . Nitrous ammoniac reduced it from 50° to 15° ; but the cold was not augmented by the addition of sal ammoniac or nitre.

8
The most remarkable experiment, however, was His method with spirit of nitre poured on Glauber's salt, the effect of which was found to be similar to that of the same spirit poured on ice or snow; and the addition of sal ammoniac rendered the cold still more intense. The proportions of these ingredients recommended by Mr Walker are concentrated nitrous acid two parts by weight, water one part; of this mixture cooled to the temperature of the atmosphere 18 ounces, of Glauber's salt a pound and an half avoirdupois, and of sal ammoniac 12 ounces. On adding the Glauber's salt to the

Cold.

7
Mr Walker's experiments.

His method of freezing quicksilver.

Cold. the nitrous acid, the thermometer fell from 50° to -10° , or 52 degrees; and on the addition of the sal ammoniac, to -9° . Thus Mr Walker was able to freeze quicksilver without either ice or snow, when the thermometer stood at 45° . For the experiment four pans were procured of different sizes, so that one might be put within the other. The largest of these pans was placed in a vessel still larger, in which the materials for the second frigorific mixture were thinly spread in order to be cooled; the second pan, containing the liquor, viz. the vitriolic acid properly diluted, was placed in the largest pan; the third pan, containing the salts for the third mixture, was immersed in the liquor of the second pan; and the liquor for the third mixture was put into wide-mouthed phials, which were immersed in the second pan likewise, and floated round the third pan; the fourth pan, which was the smallest of all, containing its cooling materials, was placed in the midst of the salts of the third pan. The materials for the first and second mixture consisted of diluted vitriolic acid and Glauber's salt; the third and fourth of diluted nitrous acid, Glauber's salt, and sal ammoniac, in the proportions above mentioned. The pans being adjusted in the manner already mentioned, the materials of the first and largest pan were mixed: this reduced the thermometer to 10° , and cooled the liquor in the second pan to 20° ; and the salts for the second mixture, which were placed underneath in the large vessel, nearly as much. The second mixture was then made with the materials thus cooled, and the thermometer was reduced to 3° . The ingredients of the third mixture, by immersion in this, were cooled to 10° ; and, when mixed, reduced the thermometer to -15° . The materials for the fourth mixture were cooled by immersion in this third mixture to about -12° . On mixture they sunk the mercury very rapidly, and seemingly below -40° , though the fourth occasioned by the ebullition of the materials prevented any accurate observation. The reason why this last mixture reduced the thermometer more than the third, though both were of the same materials, and the latter of a lower temperature, was supposed to have been partly because the fourth pan had not another immersed in it to give it heat, and partly because the materials were reduced to a finer powder.

The experiments were repeated with many variations; but only one mixture appeared to Dr Beddoes, by whom the account was communicated to the Royal Society, to be applicable to any useful purpose. This is oil of vitriol diluted with about an equal quantity of water; which, by dissolving Glauber's salt, produces about 46° of cold, and by the addition of sal ammoniac becomes more intense by a few degrees. At one time, when Mr Walker was trying a mixture of two parts of oil of vitriol and one of water, he perceived, that at the temperature of 35° the mixture coagulated as if frozen, and the thermometer became stationary; but on adding more Glauber's salt, it fell again in a short time: but less cold was produced than when this circumstance did not occur, and when the acid was weaker. The same appearance of coagulation took place with other proportions of acid and water, and with other temperatures.

It is observable, that this effect of Glauber's salt in producing cold took place only when it was possessed

of its water of crystallization; and thus the mineral alkali also augmented the cold of some of the mixtures: but when the water of crystallization was dissipated, neither of them had any effect of this kind. "This circumstance (says Dr Beddoes), leads us in some measure to the theory of the phenomenon. Water undoubtedly exists in a solid state in crystals; it must therefore, as in other cases, absorb a determinate quantity of fire before it can return to its liquid state. On this depends the difference between Glauber's salt and mineral alkali in its different states of crystallization and efflorescence. The same circumstance, too, enables us to understand the great effect of Glauber's salt; which, as far as I understand, has the greatest quantity of water of crystallization." On this the reviewers remark, that "if in summer the water brought from a deep well is at 52° , in this cheap and easy way it might be reduced to 12° ; and wine placed in it would be chilled."

These excessive degrees of cold occur naturally in many parts of the globe in the winter-time. It is true, we are very much unacquainted with them in this country: yet in the winter of 1780, Mr Wilson of Glasgow observed, that a thermometer laid on the snow sunk to 25° below 0; but this was only for a short time; and in general our atmosphere does not admit of very great degrees of cold for any length of time. Mr Derham, however, in the year 1708, observed in England, that the mercury stood within one-tenth of an inch of its station when plunged into a mixture of snow and salt. In 1732, the thermometer at Petersburg stood at 28° below 0; and in 1737, when the French academicians wintered at the north polar circle, or near it, the thermometer sunk to 33° below 0; and in the Asiatic and American continents, still greater degrees of cold are very common.

The effects of these extreme degrees of cold are very surprising. Trees are burst, rocks rent, and rivers and lakes frozen, several feet deep: metallic substances blister the skin like red-hot iron: the air, when drawn in by respiration, hurts the lungs, and excites a cough: even the effects of fire in a great measure seem to cease; and it is observed, that though metals are kept for a considerable time before a strong fire, they will still freeze water when thrown upon them. When the French mathematicians wintered at Tornea in Lapland, the external air, when suddenly admitted into their rooms, converted the moisture of the air into whirls of snow; their breasts seemed to be rent when they breathed it, and the contact of it was intolerable to their bodies; and the spirit of wine, which had not been highly rectified, burst some of their thermometers by the congelation of the aqueous part.

Extreme cold very often proves fatal to animals in those countries where the winters are very severe; and thus 7000 Swedes perished at once in attempting to pass the mountains which divide Norway from Sweden. It is not necessary, indeed, that the cold, in order to prove fatal to the human life, should be so very intense as has been just mentioned. There is only requisite a degree somewhat below 32° of Fahrenheit, accompanied with snow or hail, from which shelter cannot be obtained. The snow which falls upon the clothes, or the uncovered parts of the body, then melts, and by a continual evaporation carries off the animal heat to such

Cold.

Observations on the experiment.

Cold
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Colding-
ham.

such a degree, that a sufficient quantity is not left for the support of life. In such cases, the person first feels himself extremely chill and uneasy; he begins to turn listless, unwilling to walk or use exercise to keep himself warm; and at last turns drowsy, sits down to refresh himself with sleep, but wakes no more. An instance of this was seen not many years ago at Terra del Fuego; where Dr Solander, with some others, having taken an excursion up the country, the cold was so intense, that one of their number died. The Doctor himself, though he had warned his companions of the danger of sleeping in that situation, yet could not be prevented from making that dangerous experiment himself; and though he was awaked with all possible expedition, his body was so much shrunk in bulk, that his shoes fell off his feet, and it was with the utmost difficulty that he was recovered.

In those parts of the world where vast masses of ice are produced, the accumulation of it, by absorbing the heat of the atmosphere, occasions an absolute sterility in the adjacent countries, as is particularly the case with the island of Iceland; where the vast collections of ice floating out from the Northern Ocean, and stopped on that coast, are sometimes several years in thawing. Indeed, where great quantities of ice are collected, it would seem to have a power like fire, both augmenting its own cold and that of the adjacent bodies. An instance of this is related under the article EVAPORATION, in Mr Wedgewood's experiment, where the true cause of this phenomenon is also pointed out.

COLD, in medicine. See *MEDICINE-Index*.

COLD, in farriery. See there, § iii.

COLDENIA, in botany: A genus of the tetragynia order, belonging to the tetrandria class of plants; and in the natural method ranked among those the order of which is doubtful. The calyx is tetraphyllous; the corolla funnel-shaped; the styles four; the seeds two and bilocular. There is but one species, a native of India. It is an annual plant, whose branches trail on the ground, extending about six inches from the root. They are adorned with small blue flowers growing in clusters, which come out from the wings of the leaves. They are propagated by seeds sown on a hot-bed; when the plants come up, they may be removed each into a separate pot, and plunged into a hot-bed of tanner's-bark, where they are to remain constantly.

COLDINGHAM, supposed to be the *Colonia* of Ptolemy, and called by Bede the city *Coldana* and of Golud (*Coludum*), situated on the borders of Scotland, about two miles from Eymouth, was a place famous many ages ago for its convent. This was the oldest nunnery in Scotland, for here the virgin-wife Etheldreda took the veil in 670; but by the ancient name *Coludum* it should seem that it had before been inhabited by the religious called *Culdees*. In 870 it was destroyed by the Danes, but its name rendered immortal by the heroism of its nuns; who, to preserve themselves inviolate from those invaders, cut off their lips and noses; and thus rendering themselves objects of horror, were, with their abbess Ebba, burnt in the monastery by the disappointed savages. After this it lay deserted till the year 1098, when king Edgar founded on its site a priory of benedictines in honour of St Cuthbert, and bestowed it on the monks of Durham.

Mr Pennant's description of the black, joyless,
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heathy-moor, where it was situated, might be sufficient to guard the fair inhabitants of the nunnery were it still subsisting. That description, however, is now altogether inapplicable: The whole tract, five miles over, has been since improved, and converted into corn fields: the cheerless village of Old Cambus is no more; a decent inn with good accommodations has been established at a convenient distance; and the passage of the steep glen called the *Pease*, which terminates the moor on the road towards Edinburgh, and was formerly the terror of travellers, is now rendered safe and easy by means of a bridge extending from one side of the chasm to the other.

COLDINGUEN, a town of Denmark, in North Jutland, and diocese of Ripen. It is remarkable for its bridge, over which pass all the oxen and other cattle that go from Jutland into Germany, which brings in a considerable revenue to the king. It is seated on an eminence, in a pleasant country abounding with game. E. Long. 9. 25. N. Lat. 55. 35.

COLD-RINCH, a species of *MOTACILLA*.

COLD-SHIRE IRON, that which is brittle when cold.

COLE (William), the most famous botanist of his time, was born at Adderbury in Oxfordshire, about the year 1626, and studied at Merton college in Oxford. He at length removed to Putney, near London; and published "The Art of Simpling; and Adam in Eden, or Nature's Paradise." Upon the restoration of king Charles II. he was made secretary to Dr Duppa, bishop of Winchester; but died two years after, aged 37.

COLE-FISH, a species of *GADUS*.

COLE-Seed, the seed of the *napus sativa*, or long-rooted, narrow-leaved rapa, called in English *navew*, and reckoned by Linnæus among the brassicas, or cabbage-kind. See *BRASSICA*.

This plant is cultivated to great advantage in many parts of England, on account of the rape oil expressed from its seeds. The practice of sowing it was first introduced by those Germans and Dutchmen who drained the fens of Lincolnshire; and hence the notion hath generally prevailed, that it will thrive only in a marshy soil; but this is now found to be a mistake. In preparing the land which is to receive it, care must be taken to plow it in May, and again about midsummer, making the ground as fine and even as possible. It is to be sown the very day of the last plowing, about a gallon on an acre. In the months of January, February, and March, it affords very good food for cattle, and will sprout again when cut; after which it is excellent nourishment for sheep. After all, if it is not too closely fed, it will bear seed against next July. The same caution, however, is requisite with this food as with clover, till cattle are accustomed to it, otherwise it is apt to swell them. When this plant is cultivated solely with a view to the seed, it must be sown on deep strong land without dung, and must be suffered to stand till one-half of the seeds at least are turned brown; which, according to the seasons, will be sometimes sooner sometimes later. In this state it is to be cut in the same manner and with the same care as wheat; and every handful as it is cut is to be regularly ranged on sheets, that it may dry leisurely in the sun, which will commonly be in a fortnight; after which it is to be carefully threshed out, and car-

Coldinguen
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Cole.

Coleoptera
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Colet.

ried to the mill for expressing the oil. The produce of cole-seed is generally from five to eight quarters on an acre; and is commonly sold at 20s. per quarter.

COLEOPTERA, or BEETLE, the name of Linnaeus's first order of insects. See ZOOLOGY.

COLEWORT. See BRASSICA.

COLERAIN, a large town of Ireland, in the county of Londonderry and province of Ulster; seated on the river Bann, four miles south of the ocean, in W. Long. 7. 2. N. Lat. 55. 10. It was formerly a place of great consideration, being the chief town of a county erected by Sir John Perrot, during his government of Ireland; whereas it is now only the head of one of the baronies in the county of Londonderry; but it is still a corporation, and sends two members to parliament. It is of a tolerable size, and very elegantly built. The port is very indifferent, occasioned by the extreme rapidity of the river, which repels the tide, and makes the coming up to the town difficult; so that it has but little trade, and might perhaps have less, if it was not for the valuable salmon fishery, which amounts to some thousand pounds a-year. If the navigation of the Bann could be opened, which is totally obstructed by a ridge of rocks, it would quickly change the face of things; for then, by the help of this river, and the Newry canal, there would be a direct communication across the kingdom, and, with the assistance of the Black-water river, which likewise falls into Lough Neagh, almost all the counties of the province of Ulster might have a correspondence with each other by water-carriage, to their reciprocal and very great emolument.

COLES (Elisha), author of the well known Latin and English Dictionary, was born in Northamptonshire about the year 1640; and was entered of Magdalene College Oxford, which he left without taking a degree; and taught Latin to young people, and English to foreigners, in London, about the year 1663. He afterwards became an usher in Merchant-taylor's school; but for some great fault, nowhere expressly mentioned, he was forced to withdraw to Ireland, whence he never returned. He was, however, a good critic in the English and Latin tongues; and wrote several useful books of instruction in his profession.

COLET (John), dean of St Paul's, the son of Henry Colet knight, was born in London in the year 1466. His education began in St Anthony's school in that city, from whence, in 1483, he was sent to Oxford, and probably to Magdalene college. After seven years study of logic and philosophy, he took his degrees in arts. About the year 1493, Mr Colet went to Paris, and thence to Italy, probably with a design to improve himself in the Greek and Latin languages, which at this time were imperfectly taught in our universities. On his return to England in 1497, he took orders; and returned to Oxford, where he read lectures gratis, on the epistles of St Paul. At this time he possessed the rectory of Dennington in Suffolk, to which he had been instituted at the age of 19. He was also prebendary of York, and canon of St Martin's le Grand in London. In 1502 he became prebendary of Sarum; prebendary of St Paul's in 1505; and immediately after dean of that cathedral, having previously taken the degree of doctor of divinity. He was no sooner raised to this dignity, than he introduced the practice

of preaching and expounding the scriptures; and soon after established a perpetual divinity lecture in St Paul's church, three days in every week; an institution which gradually made way for the reformation. About the year 1508, dean Colet formed his plan for the foundation of St Paul's school, which he completed in 1512, and endowed with estates to the amount of L. 122 and upwards. The celebrated grammarian, William Lilye, was his first master, and the company of mercers were appointed trustees. The dean's notions of religion were so much more rational than those of his cotemporary priests, that they deemed him little better than a heretic; and on that account he was so frequently molested, that he at last determined to spend the rest of his days in peaceful retirement. With this intention he built a house near the palace at Richmond; but, being seized with the sweating sickness, he died in 1519, in the 53d year of his age. He was buried on the south side of the choir of St Paul's; and a stone was laid over his grave, with no other inscription than his name. Besides the preferments above mentioned, he was rector of the guild of Jesus at St Paul's, and chaplain to king Henry VIII. Dean Colet, though a papist, was an enemy to the gross superstitions of the church of Rome. He disapproved auricular confession, the celibacy of the priests, and such other ridiculous tenets and ceremonies as have ever been condemned by men of sound understanding in every age and country. He wrote, 1. *Rudimenta grammatices*. 2. The construction of the eight parts of speech. 3. Daily devotions. 4. *Epistole ad Erasmus*. 5. Several sermons; and other works which still remain in manuscript.

COLIBERTS (*Coliberti*), in law, were tenants in soccage, and particularly such villeins as were manumitted or made freemen. But they had not an absolute freedom; for though they were better than servants, yet they had superior lords to whom they paid certain duties, and in that respect might be called servants, though they were of middle condition between freemen and servants.

COLIC, a severe pain in the lower venter, so called because the colon was formerly supposed to be the part affected. See *MEDICINE-Index*.

COLIC, in farriery. See there, § xiii.

COLIGNI (Gaspard de), admiral of France, was born in 1516. He signalized himself in his youth, in the reigns of Francis I. and Henry II. and was made colonel of infantry and admiral of France in 1552. Henry II. employed him in the most important affairs; but after the death of that prince, he embraced the reformed religion, and became the chief of the Protestant party: he strongly opposed the house of Guise, and rendered this opposition so powerful, that it was thought he would have overturned the French government. On the peace made after the battles of Jarnac and Montcontour, Charles IX. deluded Coligni into security by his deceitful favours; and though he recovered one attempt on his life, when he attended the nuptials of the prince of Navarre, yet he was included in the dreadful massacre of the Protestants on St Bartholomew's-day 1572, and his body treated with wanton brutality by a misguided Popish populace.

COLIMA, a sea-port town of Mexico in North America, and capital of a fertile valley of the same name.

Coliberts
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Colima.

Colioure name. It is seated at the mouth of a river in W. Long. 109. 6. N. Lat. 18. 30.

Collar.

COLIOURE, a small, but ancient and strong town of France, in Roussillon, seated at the foot of the Pyrenean mountains, with a small harbour. E. Long. 3. 10. N. Lat. 43. 24.

COLIR, an officer in China, who may properly be called an inspector, having an eye over what passes in every court or tribunal of the empire. In order to render him impartial, he is kept independent, by having his post for life. The power of the colirs is such, that they make even the princes of the blood tremble.

COLISEUM, or **COLISÆUM**, in the ancient architecture, an oval amphitheatre, built at Rome by Vespasian, in the place where stood the basin of Nero's gilded house. The word is formed from *colosseum*, on account of the colossus of Nero that stood near it; or, according to Nardini, from the Italian *coliseo*. In this were placed statues, representing all the provinces of the empire: in the middle whereof stood that of Rome, holding a golden apple in her hand. The same term, *coliseum*, is also given to another amphitheatre of the emperor Severus. In these *colisea* were represented games, and combats of men and wild beasts: but there are now little remaining of either of them, time and war having reduced them to ruins.

COLITES, in natural history, a name given by some writers to a kind of pebble, found in the shape of the human penis and testes, and that either separately or both together.

COLLAERT (Adrian), an eminent engraver who flourished about 1550, was born at Antwerp. After having learned in his own country the first principles of engraving, he went to Italy, where he resided some time to perfect himself in drawing. He worked entirely with the graver, in a firm neat style, but rather stiff and dry. The vast number of plates executed by his hand sufficiently evince the facility with which he engraved; and though exceedingly neat, yet they are seldom highly finished.

COLLAERT (Hans or John), son to the foregoing, was also an excellent artist. He drew and engraved exactly in the style of his father; and was in every respect equal to him in merit. He must have been very old when he died; for his prints are dated from 1555 to 1622. He assisted his father in all his great works, and engraved besides a prodigious number of plates of various subjects. One of his best prints is *Moses striking the rock*, a large print, lengthwise, from Lambert Lombard. A great number of small figures are introduced into this print; and they are admirably well executed: the heads are fine, and the drawing very correct.

COLLAR, in Roman antiquity, a sort of chain put generally round the neck of slaves that had run away, after they were taken, with an inscription round it, intimating their being deserters, and requiring their being restored to their proper owners, &c.

COLLAR, in a more modern sense, an ornament consisting of a chain of gold, enamelled, frequently set with ciphers or other devices, with the badge of the order hanging at the bottom, wore by the knights of several military orders over their shoulders, on the mantle, and its figure drawn round their armories.

Thus, the collar of the order of the garter consists

of S.S. with roses enamelled red, within a garter enamelled blue, and the George at the bottom.

Lord Mayor's COLLAR is more usually called chain. See CHAIN.

Knights of the COLLAR, a military order in the republic of Venice, called also the order of St Mark, or the medal. It is the doge and the senate that confer this order; the knights bear no particular habit, only the collar, which the doge puts around their neck, with a medal, wherein is represented the winged lion of the republic.

COLLAR of a Draught-horse, a part of harness made of leather and canvas, and stuffed with straw or wool; to be put about the horse's neck.

COLLORAGE, a tax or fine laid for the collars of wine-drawing horses.

COLLATERAL, any thing, place, country, &c. situated by the side of another.

COLLATERAL, in genealogy, those relations which proceed from the same stock, but not in the same line of ascendants or descendants, but being, as it were, aside of each other. Thus, uncles, aunts, nephews, nieces, and cousins, are collaterals, or in the same collateral line: those in a higher degree, and nearer the common root, represent a kind of paternity with regard to those more remote. See CONSANGUINITY.

COLLATERAL Succession. When a defunct, for want of heirs descended of himself, is succeeded in his estate by a brother or sister, or their descendants, the estate is said to have gone to *collateral heirs*.

COLLATIA (anc. geog.), a town of the Sabines; thought to be distant between four or five miles out of Rome to the east; situated on an eminence (Virgil). Of this place was Tarquinius Collatinus, married to Lucretia, ravished by Sextus Tarquinius (Livy); situated on this or on the left side of the Anio (Pliny). Extant in Cicero's time, but in Strabo's day only a village; now no trace remains of it.—Another supposed *Collatia* of Apulia, near mount Garganus; because Pliny mentions the *Collatini* in Apulia, and Frontinus the *Ager Collatinus*.

COLLATINA PORTA, a gate of Rome, at the Collis Hortulorum, afterwards called *Pinciana*, from the Pincii, a noble family. Its name *Collatina*, is from *Collatia*, to the right of which was the Via Collatina, which led to that town.

COLLINA, a gate of Rome at the Collis Quirinalis, not far from the temple of Venus Erycina (Ovid); called also *Salaria*, because the Sabines carried their salt through it (Tacitus). Now *Salara*.

COLLATION, in the canon law, the giving or bestowing of a benefice on a clergyman by a bishop, who has it in his own gift or patronage. It differs from institution in this, that institution is performed by the bishop, upon the presentation of another, and collation is his own act of presentation: and it differs from a common presentation, as it is the giving of the church to the person, and presentation is the giving or offering of the person to the church. But collation supplies the place of presentation and institution; and amounts to the same as institution where the bishop is both patron and ordinary. Anciently the right of presentation to all churches was in the bishop; and now if the patron neglects to present to a church, then this right returns to the bishop by collation: if the bishop neglects to collate within six months

Collar
||
Collation.

Collation after the elapse of the patron, then the archbishop hath a right to do it; and if the archbishop neglects, then it devolves to the king; the one as superior, to supply the defects of bishops, the other as supreme, to supply all defects of governments.

COLLATION, in common law, the comparison or presentation of a copy to its original, to see whether or not it be conformable; or the report or act of the officer who made the comparison. A collated act is equivalent to its original, provided all the parties concerned were present at the collation.

COLLATION, in Scots law, that right which an heir has of throwing the whole heritable and moveable estates of the deceased into one mass, and sharing it equally with the others in the same degree of kindred, when he thinks such share will be more than the value of the heritage to which he had an exclusive title.

COLLATION is also used among the Romanists for the meal or repast made on a fast-day, in lieu of a supper. Only fruits are allowed in a collation: F. Lobineau observes, that anciently there was not allowed even bread in the collations in Lent, nor any thing beside a few comfits and dried herbs and fruits; which custom, he adds, obtained till the year 1513. Cardinal Humbert observes further, that in the middle of the 11th century there were no collations at all allowed in the Latin church in the time of Lent; and that the custom of collations was borrowed from the Greeks, who themselves did not take it up till about the 11th century.

COLLATION is also popularly used for a repast between meals, particularly between dinner and supper. The word collation, in this sense, Du Cange derives from *collocutio*, "conference:" and maintains, that originally collation was only a conference, or conversation on subjects of piety, held on fast-days in monasteries; but that, by degrees, the custom was introduced of bringing in a few refreshments; and that by the excesses to which those sober repasts were at length carried, the name of the abuse was retained, but that of the thing lost.

COLLATION of Seals, denotes one seal set on the same label, on the reverse of another.

COLLEAGUE, a partner or associate in the same office or magistrature. See **ADJUNCT**.

COLLECT, **COLLECTION**, a voluntary gathering of money, for some pious or charitable purpose. Some say, the name *collect*, or *collection*, was used, by reason those gatherings were anciently made on the days of *collects*, and in *collects*, i. e. in assemblies of Christians; but, more probably, *quia colligebatur pecunia*.

COLLECT is sometimes also used for a tax, or imposition, raised by a prince for any pious design. Thus, histories say, that in 1166, the king of England, coming into Normandy, appointed a collect for the relief of the holy land, at the desire and after the example of the king of France. See **CROISADE**.

COLLECT, in the liturgy of the church of England, and the mass of the Romanists, denotes a prayer accommodated to any particular day, occasion, or the like. See **LITURGY**, and **MASS**.

In the general, all the prayers in each office are called *collects*: either because the priest speaks in the name of the whole assembly, whose sentiments and desires he sums up by the word *oremus*, "let us pray," as is observed by pope Innocent III. or, because those

prayers are offered when the people are assembled together, which is the opinion of Pamelius on Tertullian.

The congregation itself is in some ancient authors called *collect*. The popes Gelafius and Gregory are said to have been the first who established *collects*. Despence, a doctor of the faculty of Paris, has an express treatise on *collects*, their origin, antiquity, authors, &c.

COLLECTIVE, among grammarians, a term applied to a noun expressing a multitude, though itself be only singular; as an army, company, troop, &c. called *collective nouns*.

COLLECTOR, in general, denotes a person who gets or brings together things formerly dispersed and separated. Hence,

COLLECTOR, in matters of civil polity, is a person appointed by the commissioners of any duty, the inhabitants of a parish, &c. to raise or gather any kind of tax.

COLLECTOR, among botanists, one who gets together as many plants as he can, without studying botany in a scientific manner.

COLLEGATORY, in the civil law, a person who has a legacy left him in common with one or more other persons.

COLLEGE, an assemblage of several bodies or societies, or of several persons into one society.

College, among the Romans, served indifferently for those employed in the offices of religion, of government, the liberal and even mechanical arts and trades; so that, with them, the word signified what we call a corporation or company.

In the Roman empire, there were not only the *college of augurs*, and the *college of capitolini*, i. e. of those who had the superintendence of the capitoline games; but also colleges of artificers, *collegia artificum*; college of carpenters, *fabricorum*, or *fabrorum tignariorum*; of potters, *figulorum*; of founders, *arariorum*; the college of locksmiths, *fabrorum ferrariorum*; of engineers of the army, *tignariorum*; of butchers, *laniorum*; of dendrophori, *dendrophororum*; of centonaries, *centonariorum*; of makers of military casques, *sagariorum*; of tent-makers, *tabernaculariorum*; of bakers, *pistorum*; of musicians, *tibicinum*, &c. Plutarch observes, that it was Numa who first divided the people into colleges; which he did to the end that each consulting the interests of their college, whereby they were divided from the citizens of the other colleges, they might not enter into any general conspiracy against the public repose.

Each of these colleges had distinct meeting-places or halls; and likewise, in imitation of the state, a treasury and common chest, a register, and one to represent them upon public occasions, and acts of government. These colleges had the privilege of manumitting slaves, of being legates, and making by-laws for their own body, provided they did not clash with those of the government.

There are various colleges on foot among the moderns, founded on the model of those of the ancients. Such are the three colleges of the empire, viz.

COLLEGE of Electors, or *their Deputies*, assembled in the diet of Ratisbon.

COLLEGE of Princes; the body of princes, or their deputies, at the diet of Ratisbon.

COLLEGE of Cities, is, in like manner, the body of deputies which the imperial cities send to the diet.

COLLEGE of Cardinals, or the *Sacred COLLEGE*; a body

Collective
College.

College. body composed of the three orders of cardinals. See *CARDINALS.*

COLLEGE is also used for a public place endowed with certain revenues, where the several parts of learning are taught.

An assemblage of several of these colleges constitute an university. The erection of colleges is part of the royal prerogative, and not to be done without the king's licence.

The establishment of colleges or universities is a remarkable period in literary history. The schools in cathedrals and monasteries confined themselves chiefly to the teaching of grammar. There were only one or two masters employed in that office. But, in colleges, professors are appointed to teach all the different parts of science. The first obscure mention of academical degrees in the university of Paris (from which the other universities in Europe have borrowed most of their customs and institutions), occurs A. D. 1215.

COLLEGE of Civilians, commonly called *Doctors commons*; a college founded by Dr Harvey, dean of the arches, for the professors of the civil law residing in London: where usually, likewise, resides the judge of the arches court of Canterbury, judge of the admiralty, of the prerogative court, &c. with other civilians; who all live, as to diet and lodging, in a collegiate manner, commoning together; whence the appellation of *Doctors Commons*. Their house being consumed in the great fire, they all resided at Exeter-house in the Strand till 1672: when their former house was rebuilt, at their own expence, in a very splendid manner. To this college belong 34 proctors, who make themselves parties for their clients, manage their causes, &c.

COLLEGE of Physicians, a corporation of physicians in London, who, by several charters and acts of parliament of Henry VIII. and his successors, have certain privileges, whereby no man, though a graduate in physic of any university, may, without licence under the said college-seal, practise physic in or within seven miles of London; with power to administer oaths, fine and imprison offenders in that and several other particulars; to search the apothecaries shops, &c. in and about London, to see if their drugs, &c. be wholesome and their compositions according to the form prescribed by the said college in their dispensatory. By the said charter they are also freed from all troublesome offices, as to serve on juries, be constable, keep watch, provide arms, &c.

The society had anciently a college in Knight-rider-street, the gift of Dr Linacre physician to king Henry VIII. Since that time they have had a house built them by the famous Dr Harvey in 1652, at the end of Amen-corner, which he endowed with his whole inheritance in his lifetime: but this being burnt in the great fire in 1666, a new one was erected, at the expence of the fellows, in Warwick-lane, with a noble library, given partly by the marquis of Dorchester, and partly by Sir Theodore Mayerne.

Of this college there are at present a president, four censors, eight electors, a register, and a treasurer, chosen annually in October; the censors have, by charter, power to survey, govern, and arrest, all physicians, or others practising physic, in or within seven miles of London; and to fine, amerce, and imprison them, at

discretion. The number of fellows was anciently thirty, till king Charles II. increased their number to forty: and king James II. giving them a new charter, allowed the number of fellows to be enlarged so as not to exceed fourscore; reserving to himself and successors the power of placing and displacing any of them for the future.

The college is not very rigorous in asserting their privileges; there being a great number of physicians, some of very good abilities, who practise in London, &c. without their licence, and are connived at by the college: yet, by law, if any person not expressly allowed to practise, take on him the cure of any disease, and the patient die under his hand, it is deemed felony in the practitioner. In 1696, the college made a subscription, to the number of forty-two of their members, to set on foot a dispensatory for the relief of the sick poor: since that they have erected two other dispensatories.

Edinburgh COLLEGE of Physicians was erected on the 29th November 1681. The design of this institution was, to prevent the abuses daily committed by foreign and illiterate impostors, quacks, &c. For this reason, his majesty, at the time above mentioned, granted letters patent to erect into a body corporate and politic, certain physicians in Edinburgh and their successors, by the title of "the President and Royal College of Physicians at Edinburgh," with power to choose annually a council of seven, one whereof to be president: these are to elect a treasurer, clerk, and other officers; to have a common seal; to sue and to be sued; to make laws for promoting the art of physic, and regulating the practice thereof, within the city of Edinburgh, town of Leith, and districts of the Canongate, Westport, Pleasance, and Potter-row; through all which the jurisdiction of the college extends. Throughout the jurisdiction, no person is allowed to practise physic without a warrant from the college, under the penalty of L. 5 Sterling the first month, to be doubled monthly afterwards while the offence is continued; one half the money arising from such fines to go to the poor, the other to the use of the college. They are also empowered to punish all licentiates in physic within the above mentioned bounds, for faults committed against the institutions of the college; and to fine them of sums not exceeding 40 s. On such occasions, however, they must have one of the bailies of the city to sit in judgment along with them, otherwise their sentence will not be valid. They are also empowered to search and inspect all medicines within their jurisdiction, and throw out into the street all such as are bad or unwholesome. That they may the better attend their patients, they are exempted from watching, warding, and serving on juries. They are, however, restrained from erecting schools for teaching the art of physic, or conferring degrees on any person qualified for the office of a physician; but are obliged to license all such as have taken their degrees in any other university, and to admit as honorary members all the professors of physic in the rest of the universities of Scotland. These privileges and immunities are not, however, to interfere with the rights and privileges of the apothecary surgeons, in their practice of curing wounds, contusions, fractures, and other external operations.

Edinburgh COLLEGE of Surgeons. This is but a very late

College.

College. late institution, by which the surgeons of Edinburgh are incorporated into a *Royal College*, and authorised to carry into execution a scheme for making provision for their widows and children, &c. They have also the privilege of examining, and licensing, if found qualified, all practitioners in surgery within a certain bounds.

COLLEGE of Justice, the supreme civil court of Scotland; otherwise called *Court of Session*, or of *Council and Session*. See *LAW*, Part III. N^o clvii. 4.

Sion COLLEGE, or the college of the London clergy; which has been a religious house time out of mind, sometimes under the denomination of a priory, sometimes under that of a spital or hospital: at its dissolution under 31st Henry VIII. it was called *Ellyn's Spital*, from the name of its founder, a mercer, in 1329. At present it is a composition of both, viz. a college for the clergy of London, who were incorporated in 1630, in pursuance to the will of Dr White, under the name of the *President and Fellows of Sion College*; and an hospital for ten poor men and as many women. The officers of the corporation are the president, two deans, and four assistants; who are annually chosen from among the rectors and vicars of London; and are subject to the visitation of the bishop. They have a good library, built and stocked by Mr Simpson, and furnished by several other benefactors, chiefly for the clergy of the city, without excluding other students on certain terms; and a hall, with chambers for students, generally occupied by the ministers of the neighbouring parishes.

Gresham COLLEGE or *COLLEGE of Philosophy*; a college founded by Sir Thomas Gresham, and endowed with the revenue of the Royal Exchange: one moiety of this endowment the founder bequeathed to the mayor and aldermen of London and their successors, in trust, that they should find four able persons to read, within the college, divinity, geometry, astronomy, and music; who are chosen by a committee of the common council, consisting of the lord mayor and three aldermen and eight commoners, and allowed each, besides lodging, L. 50 *per annum*. The other moiety he left to the company of mercers, to find three more able persons, chosen by a committee of that company, consisting of the master and three wardens, during their office, and eight of the court of assistants, to read law, physic, and rhetoric, on the same terms; with this limitation, that the several lecturers should read in term-time, every day in the week except Sundays; in the morning in Latin, in the afternoon the same in English: but that in music to be read only in English. By 8th George III. cap. 32. the building appropriated to this college was taken down, and the excise-office erected in its room. Each of the professors is allowed L. 50 *per annum*, in lieu of the apartments, &c. relinquished by them in the college, and is permitted to marry, notwithstanding the restriction of Sir Thomas Gresham's will. The lectures are now read in a room over the Royal Exchange; and the city and mercers company are required to provide a proper place for this purpose.

In this college formerly met the Royal Society, that noble academy, instituted by king Charles II. and celebrated throughout the world for their improvements in natural knowledge. See their history and policy under *SOCIETY*.

COLLEGE de Propaganda Fide, was founded at Rome

in 1622 by Gregory XV. and enriched with ample revenues. It consists of thirteen cardinals, two priests, and a secretary; and was designed for the propagation and maintenance of the Romish religion in all parts of the world. The funds of this college have been very considerably augmented by Urban VIII. and many private donations. Missionaries are supplied by this institution, together with a variety of books suited to their several appointments. Seminaries for their instruction are supported by it, and a number of charitable establishments connected with and conducive to the main object of its institution.

Another college of the same denomination was established by Urban VIII. in 1627, in consequence of the liberality of John Baptist Viles, a Spanish nobleman. This is set apart for the instruction of those who are designed for the foreign missions. It was at first committed to the care of three canons of the patriarchal churches; but ever since the year 1641 it is under the same government with the former institution.

COLLEGE of Herald's, commonly called the *Herald's Office*; a corporation founded by charter of king Richard III. who granted them several privileges, as to be free from subsidies, tolls, offices, &c. They had a second charter from king Henry VI.; and a house built near Doctors-commons, by the earl of Derby, in the reign of king Henry VII. was given them by the duke of Norfolk, in the reign of queen Mary, which house is now rebuilt.

This college is subordinate to the earl-marshal of England. They are assistants to him in his court of chivalry, usually held in the common-hall of the college, where they sit in their rich coats of his majesty's arms. See *HERALD*.

COLLEGE of Herald's in Scotland, consists of Lyon king at arms, six heralds, and six pursuivants, and a number of messengers. See *LYON*.

COLLEGIANS, *COLLEGIANI*, *COLLEGIANTS*, a religious sect formed among the Arminians and Anabaptists in Holland, about the beginning of the seventeenth century; so called because of their colleges, or meetings, twice every week; where every one, females excepted, has the same liberty of expounding the scripture, praying, &c. They are said to be all either Arians or Socinians: they never communicate in the college, but meet twice a-year from all parts of Holland at Rhinsbergh, whence they are also called *Rhinsberghers*, a village two miles from Leyden, where they communicate together; admitting every one that presents himself, professing his faith in the divinity of the holy scriptures, and resolution to live suitably to their precepts and doctrines, without regard to his sect or opinion. They have no particular ministers, but each officiates as he is disposed. They never baptize without dipping.

COLLEGIATE, or *COLLEGIAL*, churches, are those which have no bishop's see, yet have the ancient retinue of the bishop, the *canons and prebends*. Such are Westminster, Rippon, Windsor, &c. governed by deans and chapters.

Of these collegiate churches there are two kinds; some of royal, and others of ecclesiastical foundation; each of them, in matters of divine service, regulated in the same manner as the cathedrals. There are even some collegiate churches that have the episcopal rights.

College

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Collegiate.

Collet
||
Collier.

rights. Some of these churches were anciently abbeys, which in time were secularized. The church of St Peter's, Westminster, was anciently a cathedral; but the revenues of the monastery being by act of parliament Elizabeth vested in the dean and chapter, it commenced a collegiate church. In several causes the styling it *cathedral*, instead of *collegiate*, *church* of Westminster, has occasioned error in the pleadings.

COLLET, among jewellers, denotes the horizontal face or plane at the bottom of brilliants. See BRILLIANT.

COLLET, in glass-making, is that part of glass vessels which sticks to the iron instrument wherewith the metal was taken out of the melting-pot: these are afterwards used for making green glass.

COLLETICS, in pharmaey, denote much the same with AGGLUTINANTS or VULNERARIES.

COLLIER (Jeremy), a learned English nonjuring divine, born in 1650, and educated in Caius college Cambridge. He had first the small rectory of Amp-ton, near St Edmund's Bury in Suffolk; which in six years he resigned, to come to London, in 1685, where he was made lecturer of Gray's Inn: but the change of government that followed, soon rendered the public exercise of his function impracticable. He was committed to Newgate for writing against the revolution; and again, for carrying on a correspondence which that change of events made treasonable; but was released both times, without trial, by the intervention of friends. It is observable that he carried his scruples so far, as to prefer confinement to the tacit acknowledgment of the jurisdiction of the court by accepting his liberty upon bail. Suitable to these principles, he next acted a very extraordinary part with two other clergymen of his own way of thinking, at the execution of Sir John Friend and Sir William Perkins for the assassination plot; by giving them solemn absolution, and by imposition of hands: absconding for which, he continued under an outlawry to the day of his death in 1726. These proceedings having put a stop to his activity, he employed his retired hours rather more usefully in literary works. In 1698, he attempted to reform our theatrical entertainments, by publishing his *Short view of the immorality and profaneness of the English stage*; which engaged him in a controversy with the wits of the time: but as Mr Collier defended his censures not only with wit, but with learning and reason, it is allowed that the decorum observed, for the most part, by succeeding dramatic writers, has been owing to his animadversions. He next undertook a translation of Moreri's great Historical and Geographical Dictionary; a work of extraordinary labour, and which appeared in 4 vols folio. After this he published "An Ecclesiastical History of Great Britain, chiefly of England," in 2 vols folio; which is allowed to be written with great judgment, and even with impartiality. He was besides engaged in several controversies, which his conduct and writings gave rise to, not material to mention. In queen Anne's reign, Mr Collier was tempted, by offers of considerable preferment, to a submission; but as he was a nonjuror upon principle, he could not be brought to listen to any terms.

COLLIER, or COALLIER. See COALLIER.

COLLIERY, COALERY, or COALLIERY. See Colliery || Collins.

COLLINS (Anthony), a polemical writer, born at Heston near Hounslow in the county of Middlesex in 1676, was the son of Henry Collins, a gentleman of about L. 1500 a-year. He was first bred at Eton college, and then went to kings-college Cambridge, where he had for his tutor Mr Francis Hare, afterwards bishop of Chichester. He was afterwards a student of the Temple; but not relishing the law, soon abandoned that study. He was an ingenious man, and author of several curious books. His first remarkable piece was published in 1707, "An Essay concerning the use of reason in propositions, the evidence whereof depends on human testimony." In 1702, he entered into the controversy between Mr Clark and Dr Dodwell, concerning the immortality of the soul. In 1713, he published his discourse on free-thinking; which made a prodigious noise. In 1715, he retired into the county of Essex, and acted as a justice of peace and deputy lieutenant for the same county, as he had done before for that of Middlesex and liberty of Westminster. The same year, he published a "Philosophical Essay concerning human liberty." In 1718, he was chosen treasurer of the county of Essex; and this office he discharged with great honour. In 1724, he published his "Historical and critical Essay on the 39 articles." Soon after, he published his "Discourse of the grounds and reasons of the Christian religion;" to which is prefixed, "An Apology for free debate and liberty of writing;" which piece was immediately attacked by a great number of writings. In 1726, appeared his "Scheme of literary prophecy considered, in a view of the controversy occasioned by a late book entitled, A discourse of the grounds, &c." In this discourse, he mentions a MS. dissertation of his to show the Sibylline oracles to be a forgery made in the times of the primitive Christians, who, for that reason, were called *Sibyllists* by the Pagans; but it never appeared in print. His scheme of literary prophecy was replied to by several writers; and particularly by Dr John Rogers in his "Necessity of divine revelation asserted." In answer to which, our author wrote "A letter to the Reverend Dr Rogers, on occasion, &c." His health began to decline some years before his death, and he was very much afflicted with the stone, which at last put an end to his life at his house in Harley square in 1729. He was interred in Oxford chapel, where a monument was erected to him, with an epitaph in Latin. His curious library was open to all men of letters, to whom he readily communicated all the assistance in his power; he even furnished his antagonists with books to confute himself, and directed them how to give their arguments all the force of which they were capable. He was remarkably averse to all indecency and obscenity of discourse; and was, independent of his scepticism, a sincerely good man.

COLLINS (John), an eminent accountant and mathematician, born in 1624, and bred a bookseller at Oxford. Besides several treatises on practical subjects, he communicated some curious papers to the Royal Society, of which he was a member, which are to be found in the early numbers of the Philosophical Transactions:

Collins,
Collinson.

actions; and was the chief promoter of many other scientific publications in his time. He died in 1683; and about 25 years after, all his papers coming into the hands of the learned William Jones, Esq; F. R. S. it appeared that Mr Collins held a constant correspondence for many years with all the eminent mathematicians; and that many of the late discoveries in physical knowledge, if not actually made by him, were yet brought forth by his endeavours.

COLLINS (William), an admirable poet, was born at Chichester, about the year 1724. He received his classical education at Winchester; after which he studied at New college in Oxford, was admitted a commoner of King's college in the same university, and was at length elected a demy of Magdalene college. While at Oxford, he applied himself to the study of poetry, and published his *Oriental Eclogues*; after which he came to London. He was naturally possessed of an ear for all the varieties of harmony and modulation; his heart was susceptible of the finest feelings of tenderness and humanity, and was particularly carried away by that high enthusiasm which gives to imagination its strongest colouring; and he was at once capable of soothing the ear with the melody of his numbers, of influencing the passions by the force of the pathos, and of gratifying the fancy by the luxury of description. With these powers he attempted lyric poetry; and, in 1746, published his *Odes*, descriptive and allegorical; but the sale of this work being not at all answerable to its merit, he burnt the remaining copies in indignation. Being a man of a liberal spirit and a small fortune, his pecuniary resources were unhappily soon exhausted; and his life became a miserable example of necessity, indolence, and dissipation. He projected books which he was well able to execute; and became in idea an historian, a critic, and a dramatic poet; but wanted the means and encouragement to carry these ideas into execution. Day succeeded day, for the support of which he had made no provision; and he was obliged to subsist, either by the repeated contributions of a friend, or the generosity of a casual acquaintance. His spirits became oppressed, and he sunk into a sullen despondence. While in this gloomy state of mind, his uncle colonel Martin died, and left him a considerable fortune. But this came too late for enjoyment; he had been so long harassed by anxiety and distress, that he fell into a nervous disorder, which at length reduced the finest understanding to the most deplorable childishness. In the first stages of this disorder, he endeavoured to relieve himself by travelling, and passed into France; but the growing malady obliged him to return; and having continued, with short intervals, in this pitiable state till the year 1756, he died in the arms of his sister. The ingenious Mr Longhorne has published his poetical works, with memoirs of the author, in one volume duodecimo.

COLLINSON (Peter), an eminent naturalist and antiquarian, descended of an ancient family, was born on the paternal estate called *Hugal-Hall*, or *Height of Hugal*, near Windermere lake, in the parish of Stavely, about ten miles from Kendal in Westmoreland. Whilst a youth he discovered his attachment to natural history. He began early to make a collection of dried specimens of plants, and had access to the best gardens at

that time in the neighbourhood of London. He became early acquainted with the most eminent naturalists of his time; the Drs Derham, Woodward, Dale, Lloyd, and Sloane, were amongst his friends. Among the great variety of articles which form that superb collection, now (by the wise disposition of Sir Hans and the munificence of parliament) the British Museum, small was the number of those with whose history Mr Collinson was not well acquainted; he being one of those few who visited Sir Hans at all times familiarly; their inclinations and pursuits in respect to natural history being the same, a firm friendship had early been established between them. Peter Collinson was elected a fellow of the Royal Society on the 12th of December 1728; and perhaps was one of the most diligent and useful members, not only in supplying them with many curious observations himself, but in promoting and preserving a most extensive correspondence with learned and ingenious foreigners, in all countries and on every useful subject. Besides his attention to natural history, he minuted every striking hint that occurred either in reading or conversation; and from this source he derived much information, as there were very few men of learning and ingenuity who were not of his acquaintance at home; and most foreigners of eminence in natural history, or in arts and sciences, were recommended to his notice and friendship. His diligence and economy of time was such, that though he never appeared to be in a hurry, he maintained an extensive correspondence with great punctuality; acquainting the learned and ingenious in distant parts of the globe with the discoveries and improvements in natural history in this country, and receiving the like information from the most eminent persons in almost every other. His correspondence with the ingenious Cadwallader Colden, Esq; of New York, and the justly celebrated Dr Franklin of Philadelphia, furnish instances of the benefit resulting from his attention to all improvements. The latter of these gentlemen communicated his first essays on electricity to Mr Collinson, in a series of letters, which were then published, and have been reprinted in a late edition of the Doctor's ingenious discoveries and improvements. Perhaps, in some future period, the account procured of the management of sheep in Spain, published in the *Gentleman's Magazine* for May and June 1764, may not be considered among the least of the benefits accruing from his extensive and inquisitive correspondence. His conversation, cheerful and usefully entertaining, rendered his acquaintance much desired by those who had a relish for natural history, or were studious in cultivating rural improvements; and secured him the intimate friendship of some of the most eminent personages in this kingdom, as distinguished by their taste in planting and horticulture, as by their rank and dignity. He was the first who introduced the great variety of seeds and shrubs which are now the principal ornaments of every garden; and it was owing to his indefatigable industry, that so many persons of the first distinction are now enabled to behold groves transplanted from the western continent flourishing as luxuriantly in their several domains as if they were already become indigenous to Britain. He had some correspondents in almost every nation in Europe, some in Asia, and even at Peking; who all transmitted to him

Collinsonia him the most valuable seeds they could collect, in return for the treasures of America. The great Linnaeus, during his residence in England, contracted an intimate friendship with Mr Collinson, which was reciprocally increased by a multitude of good offices, and continued to the last. Besides his attachment to natural history, he was very conversant in the antiquities of our own country, having been elected a member of the Society of Antiquaries April 7. 1737; and he supplied them often with many curious articles of intelligence and observations, respecting both our own and other countries. He died in 1768, leaving behind him many materials for the improvement of natural history.

COLLINSONIA, in botany: A genus of the monogynia order belonging to the decandria class of plants; and in the natural method ranking under the 40th order, *Personata*. The corolla is unequal, with its under lip multifid, and the segments capillary. There is only one perfect seed. There is but one species, a native of North America, but possessed of no remarkable properties.

COLLIQUAMENTUM, in natural history, an extreme transparent fluid in an egg, observable after two or three days incubation, containing the first rudiments of the chick. It is included in one of its own proper membranes; distinct from the albumen. Harvey calls it the *oculus*.

COLLIQUATION, in chemistry, is applied to animal, vegetable, and mineral substances, tending towards fusion. See **FUSION**.

COLLIQUATION, in physic, a term applied to the blood, when it loses its crasis or balsamic texture; and to the solid parts, when they waste away, by means of the animal fluids flowing off through the several glands, and particularly those of the skin, faster than they ought: which occasions fluxes of many kinds, but mostly profuse, greasy, and clammy sweats.

COLLIQUATIVE FEVER, in physic, a fever attended with a diarrhoea, or with profuse sweats.

COLLISION, the striking of one hard body against another; or the friction or percussion of bodies moving violently with different directions, and dashing against each other.

COLLUM, the same with **NECK**.

COLLUSION, in law, a secret understanding between two parties, who plead or proceed fraudulently against each, to the prejudice of a third person.

COLLUTHIANS, a religious sect, who rose about the beginning of the fourth century; on occasion of the indulgence shown to Arius by Alexander patriarch of Alexandria. Several people being scandalized at so much condescension, and, among the rest, Colluthus, a priest of the same city, he hence took a pretence for holding separate assemblies, and by degrees proceeded to the ordination of priests, as if he had been a bishop; pretending a necessity for this authority, in order to oppose Arius. To his schism he added heresy; teaching, that God did not create the wicked; that he was not author of the evils that befall men, &c. He was condemned by a council held at Alexandria by Osius, in the year 330.

COLLYBUS (κολλυβος), in antiquity, the same with what is now called the *rate of exchange*.

COLLYRÆ, or **COLLYRIDES**, in antiquity, a cer-

tain ornament of hair, worn by the women on their necks. It was made up in the form of the small roundish cakes called κολλυραι, *collyra*.

COLLYRIDIAN, in church history, a sect, towards the close of the 4th century, denominated from a little cake, called by the Greeks κολλυριδιαι, *collyridia*, which they offered to the Virgin Mary.

This sect, it seems, consisted chiefly of Arabian women, who, out of an extravagance of devotion to the Virgin, met on a certain day in the year to celebrate a solemn feast, and to render divine honours to Mary as to a goddess; eating the cake which they offered in her name. St Epiphanius, who relates the history of this superstitious ceremony, ridicules it. They sprung up in opposition to the **ANTIDICOMARIANITES**.

COLLYRIUM, in pharmacy, a topical remedy for a disorder of the eyes; designed to cool and repel hot sharp humours.

COLMAR, a considerable town of France, in Upper Alsace, of which it is the capital. It has great privileges, and the Protestants have liberty of conscience. It is seated near the river Ill, in E. Long. 7. 16. N. Lat. 48. 5.

COMARS, a town of France in Provence, and the diocese of Sens. It is seated near the Alps, in E. Long. 6. 25. N. Lat. 44. 17.

COLMOGOROD, a town of the empire of Russia, with an archbishop's see, seated in an island formed by the river Divina, in E. Long. 40. 30. N. Lat. 36. 32.

COLNBROOK, a town of Buckinghamshire in England, seated on the river Coln, which separates this county from Middlesex. It is a great thoroughfare on the western road, and has several good inns. W. Long. 0. 19. N. Lat. 51. 30.

COLNE, a town of Lancashire in England, seated on a small hill near the confines of the county. W. Long. 2. 2. N. Lat. 53. 45.

COLOCHINA, an ancient town of the Morea in Turkey in Europe. E. Long. 23. 2. N. Lat. 36. 32.

COLOCYNTHIS, in botany, a species of *CUCUMIS*.

COLOCZA, a town of Hungary, seated on the Danube, and capital of the county of Bath, with an archbishop's see. It was taken by the Turks in 1686, but afterwards retaken by the Imperialists. E. Long. 19. 42. N. Lat. 46. 33.

COLOGNA, a town of Italy in Padua, and in the territory of Venice. E. Long. 11. 43. N. Lat. 45. 39.

COLOGNE (the archbishopric or diocese of) is one of the states that compose the electoral circle of the Rhine, in Germany. It is bounded on the north by the duchy of Cleves and Gueldres, on the west by that of Juliers, on the south by the archbishopric of Cleves, and on the east by the duchy of Berg, from which it is almost wholly separated by the Rhine. This country is very fruitful in corn and wine, which the inhabitants dispose of by embarking it on the Rhine, it extending about seventy miles along that river. It is divided into the Higher and lower Diocese; the Higher Diocese contains that part which lies above Cologne, wherein is Bonne, the capital town of this electorate, and where the elector resides; besides which there are Leichnich, Andernach, Bruyl, Zulich, and Kerpen. The Lower Diocese is on the other side of Cologne, and contains the towns of Zonz, Neuys,

Collyridians
Cologne.

Cologne.

Neuys, Heizarwart, Kempen, Rhyenberg, and Alpen. The city of Cologne and county of Meurs, though within the diocese of Cologne, do not belong to it: for Cologne is a free city, and Meurs belongs to the house of Nassau-Orange; but by way of recompence, the elector has considerable possessions in Westphalia, which they call the *Domain*. It contains the duchy of Westphalia and the county of Reclinchusen. This prelate is one of the electors of the empire, and holds alternately with that of Treves the second or third rank in the electoral college. He is arch-chancellor of the empire in Italy; which dignity was very important when the emperors were masters of Italy, but now it is next to nothing. When the emperors were crowned at Aix la Chapelle, the archbishop of Cologne performed the ceremony, which caused him to pretend to the same right elsewhere: but he was opposed by the archbishop of Mentz. This occasioned an order, that they should each of them have that honour in their own diocese, but if it was done elsewhere, they should perform it alternately. The archbishop of Cologne is elected by the chapter in that city, which is the most illustrious in all Germany. They are all princes or counts, except eight doctors, who have no occasion to prove their nobility.

COLOGNE, an ancient and celebrated town of Germany, in the diocese of that name, with an archbishop's see, and a famous university, seated on the river Rhine, in E. Long. 6. 38. N. Lat. 50. 50. In the times of the Romans, this city was called *Colonia Agrippina*, and *Ubiarum*, because it was built by Agrippina the wife of Claudius I. and mother of Nero; and because the Ubii inhabited this country on the Lower Rhine. In 755, it was an archbishopric, and in 1260 entered into the Hanseatic league. The university was established in 1388 by Pope Urban VI. The city is fortified with strong walls, flanked with 83 large towers, and surrounded with three ditches; but these fortifications, being executed after the ancient manner, could make but a poor defence at present. It lies in the shape of a half-moon, and is said to have 20 gates, 19 parishes, 37 monasteries, and 365 churches and chapels; but the streets in general are dirty and badly paved, the windows of the houses composed of small bits of round glass, and the inhabitants are but few for so large a place. It is inhabited mostly by Papists: but there are also many Protestants, who repair to the neighbouring town of Mulheim, in the duchy of Berg, for public worship. Its trade, which is considerable, especially in Rhenish wine, is chiefly in the hands of Protestants, and carried on by the Rhine. The ships with which they trade to the Netherlands are of a particular form, and considerable burden. The clergy here are very numerous, and have large revenues. That of the archbishop is £. 130,000. Baron Polnitz says, that though Cologne is one of the greatest cities, it is one of the most melancholy in all Europe; there being nothing to be seen but priests, friars, and students, many of whom beg alms with a song: and nothing to be heard but the ringing of bells; that there are very few families of quality; that the vulgar are very clownish; and that the noblemen of the chapter stay no longer in town than their duty obliges them. Mr Wright in his travels, says, that the women go veiled; and that the best gin is that

Cologne.

distilled from the juniper berries which grow in this neighbourhood. This city is perhaps the most remarkable of any in the world for the great number of precious relics it contains; of which the Popish clergy, no doubt, make their advantage. In the church of St Ursula, they pretend to show her tomb, and the bones of the 11,000 pretended virgin martyrs, though that story is entirely owing to a mistaken inscription. The heads of some of these imaginary martyrs are kept in cases of silver, others are covered with stuffs of gold, and some have caps of cloth of gold and velvet. Brevat says, he saw between 4 and 5000 skulls, decked with garlands, and coronets, ranged on shelves. The canonesses of St Ursula, who must be all countesses, have a handsome income. In their church they pretend to show three of the thorns of our Saviour's crown, and one of the vessels which contained the water that he converted into wine at the marriage of Cana. In the church of St Gereon are 900 heads of Moorish Cavaliers, said to have been in the army of Constantine before it was converted, and to have been beheaded for refusing to sacrifice to idols. Every one of the heads has a cap of scarlet, adorned with pearls. In the magnificent cathedral of St Peter, the three wise men who came from the east to visit our Saviour, are said to be interred. They lie in a large purple shrine spangled with gold set upon a pedestal of brass, in the midst of a square mausoleum, faced within and without with marble and jasper. It is opened every morning at nine o'clock, if two of the canons of the cathedral are present, when these kings or wise men are seen lying at full length, with their heads bedecked with a crown of gold garnished with precious stones. Their names, which are *Gaspar*, *Melchier*, and *Balthasar*, are in purple characters on a little grate, which is adorned with an infinite number of large rich pearls and precious stones, particularly an oriental topaz as big as a pigeon's egg, and valued at above 30,000 crowns. Over against them are six large branches of silver, with wax candles, which burn night and day. The bones of these men, we are told, were brought to Constantinople by Helena mother to Constantine, from thence to Milan by Eustorgius bishop of that see, and afterwards hither by archbishop Rainold. In the Jesuits college are the portraits of the first 13 generals of that order, with Ignatius Loyola at their head; and in the church, which is the finest in Cologne, are many rich statues, with an amazing quantity of fine silver plate; and the utensils for mass are all of gold enriched with precious stones. In the Cordeliers church, is the tomb of the famous Duns Scotus, surnamed *Doctor Subtilis*, with this epitaph, "Scotia me genuit, Anglia me suscepit, Gallia me docuit, Colognia me tenet." Cologne is a free imperial city, and as such has a seat and voice at the diets of the empire, and circle of the Lower Rhine. In those of the empire, it has the first place on the Rhenish bench. Towards the defence of the empire, its assessment is 825 florins; and towards the maintenance of the chamber-court, 405 rix-dollars, 72½ kruitzers each term. Its militia consists of four companies of foot, who keep guard at the gates. It is governed by its own senate, in respect to civil matters and causes; but the criminal jurisdiction belongs to the elector and his chapter; and so jealous are the inhabitants

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bitants of him, that they will not permit him to stay in the city above three days at a time, nor to come into it with a large retinue. For this reason the elector resides commonly at Bonn.

COLOGNE-Earth, a kind of very light bastard ochre, of a deep brown colour.

COLOMBO, a handsome, pleasant, and strong town of Asia, seated on the eastern side of the island of Ceylon in the East Indies. It was built by the Portuguese in 1638; and in 1658 they were driven from it by the natives, assisted by the Dutch, who are now in possession of it. It is about three quarters of a mile long, and as much in breadth. The natives live in the old town, without the walls of the new: the streets of this last are wide and spacious; and the buildings are in the modern taste, particularly the governor's house, which is a handsome structure. E. Long. 80. 25. N. Lat. 7. 0.

COLOMEY, or **COLOMIA**, a town of Poland in Red Russia, seated on the river Pruth, in E. Long. 25. 9. N. Lat. 48. 45.

COLOMNA (Fabio), a very learned botanist, born at Naples about the year 1567. He became skilled in the languages, in music, designing, painting, and the mathematics; and died about the middle of the 17th century. He wrote, 1. "*Πυρολασάριον*," seu Plantarum aliquot (ac piscium) historia. 2. *Minus cognitatarum rariorumque stirpium* *εξήρασις*; itemque de aquatilibus, aliisque nonnullis animalibus, libellus;" and other works.

COLON, in anatomy, the first and most considerable of the large intestines. See **ANATOMY**, under n° 93.

COLON, in grammar, a point, or character formed thus [:], serving to mark a pause, and to divide the members of a period. See **POINTING**; see also **PERIOD**, **COMMA**, and **SEMICOLON**. Grammarians generally assign the use of a colon to be, to mark the middle of a period; or to conclude a sense less perfect than the dot or period:—but a sense less perfect than the period, is an expression extremely vague and indeterminate. See **PERIOD**.

Others say, a colon is to be used when the sense is perfect, but the sentence not concluded: but neither is this over clear and express.

A late author, in an ingenious discourse, *De ratione interpungendi*, marks the office of the colon, and wherein it differs from the semicolon, &c. more precisely. A colon, on his principles, serves to distinguish those conjunct members of a sentence, which are capable of being divided into other members; whereof one, at least, is conjunct. Thus, in the sentence, *As we cannot discern the shadow moving along the dial-plate, so the advances we make in knowledge are only perceived by the distance gone over*; the two members being both simple, are only separated by a comma. In this, *As we perceive the shadow to have moved, but did not perceive it moving; so our advances in understanding, in that they consist of such minute steps, are only perceivable by the distance*; the sentence being divided into two equal parts, and those conjunct ones, since they include others; we separate the former by a semicolon, and the latter by commas. But in this, *As we perceive the shadow to have moved along the dial, but did not perceive*

it moving; and it appears the grass has grown, though no body ever saw it grow: so the advances we make in knowledge, as they consist of such minute steps, are only perceivable by the distance—the advancement in knowledge is compared to the motion of a shadow, and the growth of grass; which comparison divides the sentence into two principal parts: but since what is said of the movement of the shadow, and likewise of the growth of grass, contains two simple members, they are to be separated by a semicolon; consequently a higher pointing is required to separate them from the other part of the sentence, which they are opposed to: and this is a colon. See **PUNCTUATION**.

COLONEL, in military matters, the commander in chief of a regiment, whether horse, foot, or dragoons.

Skinner derives the word from colony; being of opinion, the chiefs of colonies, called *coloniales*, might give the name to chiefs of forces. In the French and Spanish armies, colonel is confined to the infantry and dragoons: the commanding officer of a regiment of horse they usually call *mestre de camp*. Formerly instead of colonel, the French used the word coronel; and this old spelling comes nearer to our common way of pronouncing the word *colonel*.

A colonel may lay an officer of his regiment in arrest, but must acquaint the general with it; he is not allowed a guard, only a centry from the quarter-guard.

COLONEL-Lieutenant, he who commands a regiment of guards, whereof the king, prince, or other person of the first eminence, is colonel. These colonel-lieutenants have always a colonel's commission, and are usually general-officers.

Lieutenant-COLONEL, the second officer in a regiment, who is at the head of the captains, and commands in the absence of the colonel.

COLONIA, (anc. geog.) a town of the Trinobantes, a little above Camelodunum. Now Colchester in Essex, according to Camden, who supposes it to take its name from the river Colne, and not that it was a colony. Though others think Antonine's distances agree with Sudbury.

COLONIA Equestris, an ancient and noble colony on the Lacus Lemanus. It appears to be the work of Julius Cæsar, who settled there *Equites Limitanei*: and to this Lucan is thought to refer. By the Itinerary it is supposed to have stood between Laufane and Geneva, 12 miles from the last place by Peutinger's map; which directs to Nyon, placed in Cavo Lemano, according to Lucan's expression, that is, a bay or cove of the lake. Its ancient name was *Noviodunum*, (*Notitia Galliae*); hence its modern name.

COLONIA Metallina, or *Metallinensis*, a town of Lusitania, situated on the right or west side of the Anas, or Guadiana; but now on the left or east side, from the river's shifting its bed or channel, and called Medelin, a town in Estremadura. W. Long. 6. 12. Lat. 38. 45.

COLONIA Morinorum, a town of Belgica, thought to be Tarvenna, the capital of the Morini. Now Terrouen, a town of Artois. E. Long. 2. 15. Lat. 50. 37.

COLONIA Norbensis, or *Norba Cæsarea*, a town of Lusitania, to the south of Trajan's bridge on the Ta-

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gus. Now *Alcantara*, in *Estremadura*. W. Long. 7. 10. N. Lat. 39. 10.

COLONIA TRAJANA, (Antonine, Peutinger); a town of Belgica; surnamed also *Ulpia*, (Antonine); and *Tricesima*, from being the station of the thirtieth legion, (Ammian). Now Kellen, a village of the duchy of Cleves, a mile from the Rhine.

COLONIA VALENTIA, (Ptolemy, Livy); a town of the Hither Spain, on the Turias; destroyed by Pompey, (Sallust); restored by Julius Caesar. Still called *Valencia*, on the river Guadalaviar, in Valencia. W. Long. 35'. Lat. 39. 20.

COLONNA, a town of Italy, in the campagna of Rome, 18 miles eastward of that city. E. Long. 13. 15. N. Lat. 42. 0.

COLONNA (Pompey), cardinal archbishop of Montreal in Sicily, and bishop of a very great number of places, made a conspicuous figure in the world. He was equally qualified to wear the cardinal's hat and the helmet, and experienced more than once the reverses of fortune. Julius II. removed him from all his dignities; but Leo I. restored him, created him cardinal, and sent him on several embassies. Clement VII. divested him of the purple, and again restored him to it. It was pretended he was obliged to him for his exaltation to the papal throne. The pope refusing him some request, he reproached him, saying "That it was by his interest he had arrived at his dignity." The pope replied, "It is true; but let me be pope, and do not endeavour to be so yourself; for by acting as you do, you endeavour to dispossess me of that you have raised me to." He died viceroy of Naples in 1532. He wrote some poems in praise of Isabella Filamarini, in which he protests the chastity of his wishes. He wrote another work, *De laudibus mulierum*.

COLONNADE, in architecture, a peristyle of a circular figure; or a series of columns disposed in a circle, and insulated within side.

A *Polystyle COLONNADE*, is that whose numbers of columns is too great to be taken in by the eye at a single view. Such is the colonnade of the palace of St Peter's at Rome, consisting of 284 columns of the Doric order, each above four feet and an half diameter, all in Tiburtine marble.

COLONOS, (anc. geog.) an eminence near Athens, whither Oedipus, after his banishment from Thebes, is said to have retired: and hence it is that Sophocles calls the tragedy on the subject, *Oedipus Coloneus*. A place sacred to Neptune, and where stood an equestrian statue of him. Here also stood Timon's tower; who, for his love of solitude, and hatred to mankind, was called *Misanthropos*, (Pausanias).

COLONSAY, one of the Hebrides or Western Islands belonging to Scotland. It comprehends that of Oronsay, from which it is only separated in time of flood, and both belong to the same proprietor, viz. Mr M'Neil. See ORONSAY.

COLONUS, an husbandman, or villager, who was bound to pay yearly a certain tribute, or at certain times of the year to plough some part of the lord's land; and from hence comes the word *clown*, who is called by the Dutch *boor*.

COLONY, a company of people transplanted in-

to a remote province in order to cultivate and inhabit it. Colony.

We may distinguish three kinds of colonies. First, those serving to ease or discharge the inhabitants of a country, where the people are become too numerous, so that they cannot any longer conveniently subsist.

The second are those established by victorious princes and people in the middle of vanquished nations, to keep them in awe and obedience.

The third may be called *colonies of commerce*; because, in effect, it is trade that is the sole occasion and object thereof.

It was by means of the first kind of colonies that, some ages after the deluge, the east first, and successively all the other parts of the earth, became inhabited: and without mentioning any thing of the Phœnician and Grecian colonies, so famous in ancient history, it is notorious that it was for the establishment of such colonies, that, during the declension of the empire, those torrents of barbarous nations, issuing, for the generality, out of the north, over-run the Gauls, Italy, and the other southern parts of Europe; and, after several bloody battles, divided it with the ancient inhabitants.

For the second kind of colonies, the Romans used them more than any other people; and that to secure the conquests they had made from the west to the east. Every one knows how many cities in Gaul, Germany, Spain, and even England, value themselves on their having been of the number of Roman colonies.

There were two kinds of colonies among the Romans: those sent by the senate; and the military ones, consisting of old soldiers, broken and disabled with the fatigues of war, who were thus provided with lands as the reward of their services. See *BENEFICE*. The colonies sent by the senate were either Roman or Latin, i. e. composed either of Roman citizens or Latins. The Coloniz Latinæ were such as enjoyed the *jus Latii*; said to consist in those two things: one, that whoever was edile or pretor in a town of Latium, became for that reason a Roman citizen; the other, that the Latins were subject to the edicts of their own, and not to those of the Roman magistrates: in the year of the city six hundred and sixty-two, after the social war, the city was granted to all Latium, by the *lex Julia*. The coloniz Romanæ, were such as had the *jus Romanum*, but not in its full extent; namely, in the right of suffrage, putting up for honours, magistracies, command in the army, &c.; but the *jus Quiritium* only, or private right; as right of liberty, of gentility, or dignity of family, sacrifice, marriage, &c. For it was long a rule, never to grant the liberty of the city in full to colonies: nor is there any instance to the contrary, till after the social war, in the year of the city six hundred and sixty-two. According to Ulpian (*l. 1. D. de Cens.*), there were other colonies, which had little more than the name; only enjoying what they called *jus Italicum*, i. e. they were free from the tributes and taxes paid by the provinces. Such were the colonies of Tyre, Berytus, Heliopolis, Palmyra, &c. M. Vaillant has filled a volume in folio with medals struck by the several colonies, in honour of the emperors who founded them.

The

Colony. The ordinary symbol they engraved on their medals was either an eagle; as when the veteran legions were distributed in the colonies; or a labourer, holding a plough drawn by a pair of oxen; as when the colony consisted of ordinary inhabitants. On all the medals are seen the names of the decemviri, who held the same rank and had the same authority there as the consuls had at Rome.

Lastly, the colonies of commerce, are those established by the British, French, Spaniards, Portuguese, and other nations within these two last centuries, and which they continue still to establish, in several parts of Asia, Africa, and America; either to keep up a regular commerce with the natives, or to cultivate the ground, by planting sugar-canes, indigo, tobacco, and other commodities. The principal of this kind of colonies, are in the one and the other America, northern and southern; particularly Peru, Mexico, Canada (lately Virginia, New-England, Carolina), la Louisiana, l'Acadia, Hudson's Bay, the Antilles Islands, Jamaica, Domingo, and the other islands—In Africa, Madagascar, Cape of Good Hope, Cape Verd, and its islands, and all those vast coasts extending thence as far as to the Red Sea. Lastly, in Asia, the famous Batavia of the Dutch; Goa, Diu, of the Portuguese; and some other less considerable places of the British, French, and Danes.

The practice of settling commercial colonies in distant countries hath been adopted by the wisest nations of antiquity, who acted systematically upon maxims of sound policy. This appears to have been the case with the ancient Egyptians, the Chinese, the Phœnicians, the commercial states of Greece, the Carthaginians, and even the Romans; for though the colonies of the latter were chiefly military, it could easily be shown that they were likewise made use of for the purposes of trade. The savage nations who ruined the Roman empire, fought nothing but to extirpate or hold in vassalage those whom they overcame; and therefore, whenever princes enlarged their dominions at the expence of their neighbours, they had recourse to strong forts and garrisons to keep the conquered in awe. For this they have been blamed by the famous Machiavel; who labours to show, that the settling of colonies would have been a cheaper and better method of bridling conquered countries, than building fortresses in them. John de Witt, who was one of the ablest and best statesmen that ever appeared, strongly recommended colonies; as affording a refuge to such as had been unfortunate in trade; as opening a field for such men to exert their abilities, as through want of interest could not raise themselves in their own country; and as a supplement to hospitals and other charitable foundations, which he thought in time might come to be overcharged. Some, however, have ridiculed the supposed advantages of colonies, and asserted that they must always do mischief by depopulating the mother-country.

The history of the British colonies undoubtedly shows, that when colonists become numerous and opulent, it is very difficult to retain them in proper subjection to the parent state. It becomes then a question not very easily answered, how far they are entitled to the rights they had as inhabitants of the mother-country, or how far they are bound by its laws?

On this subject Mr Blackstone hath the following observations. Colony.

“Plantations, or colonies in distant countries, are either such where the lands are claimed by right of occupancy only, by finding them desert and uncultivated, and peopling them from the mother-country; or where, when already cultivated, they have either been gained by conquest, or ceded to us by treaties. And both the rights are founded upon the law of nature, or at least on that of nations. But there is a difference between these two species of colonies, with respect to the laws by which they are bound. For it hath been held, that if an uninhabited country be discovered and planted by English subjects, all the English laws then in being, which are the birthright of every subject, are immediately there in force. But this must be understood with many and very great restrictions. Such colonists carry with them only so much of the English law as is applicable to their own situation, and the condition of an infant colony; such, for instance, as the general rules of inheritance, and of protection from personal injuries. The artificial refinements and distinctions incident to the property of a great and commercial people, the laws of policy and revenue (such especially as are enforced by penalties), the mode of maintenance for the established clergy, the jurisdiction of spiritual courts, and a multitude of other provisions, are neither necessary nor convenient for them, and therefore are not in force. What shall be admitted and what rejected, at what times, and under what restrictions, must, in cases of dispute, be decided in the first instance by their own provincial judicature, subject to the revision and controul of the king in council; the whole of their constitution being also liable to be new-modelled and reformed by the general superintending power of the legislature in the mother-country. But in conquered or ceded countries, that have already laws of their own, the king may indeed alter and change those laws; but, till he does actually change them, the ancient laws of the country remain, unless such as are against the law of God, as in an infidel country. Our American plantations are principally of this latter sort, being obtained in the last century, either by right of conquest and driving out the natives (with what natural justice I shall not at present inquire), or by treaties. And therefore, the common law of England, as such, has no allowance or authority there; they being no part of the mother-country, but distinct (though dependent) dominions. They are subject, however, to the controul of the parliament; though (like Ireland, Mann, and the rest) not bound by any acts of parliament, unless particularly named.”

With respect to their interior polity, our colonies, whether those we formerly possessed or still possess, may be distinguished into three sorts. 1. Provincial establishments, the constitutions of which depend on the respective commissions issued by the crown to the governors, and the instructions which usually accompany those commissions; under the authority of which provincial assemblies are constituted, with the power of making local ordinances, not repugnant to the laws of Britain. 2. Proprietary governments, granted out by the crown to individuals, in the nature of feudatory principalities, with all the inferior regalities,

Colony
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Colophony.

galities, and subordinate powers of legislation, which formerly belonged to the owners of counties palatine: yet still with these express conditions, that the ends for which the grant was made be substantially pursued, and that nothing be attempted which may derogate from the sovereignty of the mother-country. 3. Charter governments, in the nature of civil-corporations; with the power of making bye-laws for their own interior regulation, not contrary to the laws of Britain; and with such rights and authorities as are specially given them in their several charters of incorporation. The form of government, in most of them, is borrowed from that of England. They have a governor named by the king (or, in some proprietary colonies, by the proprietor), who is representative or deputy. They have courts of justice of their own, from whose decisions an appeal lies to the king in council here in England. Their general assemblies, which are their house of commons, together with their council of state, being their upper house, with the concurrence of the king, or his representative the governor, make laws suited to their own emergencies. But it is particularly declared, by stat. 7 and 8 W. III. c. 22. that all laws, bye-laws, usages and customs, which shall be in practice in any of the plantations, repugnant to any law made or to be made in this kingdom relative to the said plantations, shall be utterly void and of none effect. And, because several of the colonies had claimed the sole and exclusive right of imposing taxes upon themselves, the statute 6 Geo. III. c. 12. expressly declares, that all his Majesty's colonies in America, have been, are, and of right ought to be, subordinate to and dependent upon the imperial crown and parliament of Great Britain; who have full power and authority to make laws and statutes of sufficient validity to bind the colonies and people of America, subjects to the crown of Great Britain in all cases whatsoever. And the attempting to enforce this by other acts of parliament, penalties, and at last by military power, gave rise, as is well known, to the late revolt and final separation of thirteen colonies. See the article AMERICA..

COLOPHON (anc. geog.), a town of Ionia, in the Hither Asia, on a promontory on the Egean Sea, and washed by the Hælus. The ancient Colophon was destroyed by Lyfimachus, in his war with Antigonus, in order to enlarge Ephesus. Pausanias says, it was rebuilt in the neighbourhood, in a more commodious scite. This was one of the cities that laid claim to Homer. *Colophonem addere*, a proverbial saying, explained by Strabo to denote, that the Colophonian horse turned the scales in favour of the side on which they fought. The Colophonians had a grove, a temple, and an oracle of Apollo Clarius (Strabo). Of this town was the poet Antimachus, remarked on for his tumid style by Catullus. He wrote a life of Homer, whom he makes a Colophonian (Plutarch).

COLOPHONY, in pharmacy, black resin, or turpentine, boiled in water, and afterwards dried; or, which is still better, the caput mortuum remaining after the distillation of the etherial oil, being further urged by a more intense and long continued fire.—It receives its name of *colophonia*, from Colophon, a city of Ionia; because the best was formerly brought from thence. Two sorts are mentioned in ancient writings; the one dry, the other in a liquid form. The latter

seems to have been liquid pitch, which is the crude Colophon; the other was called *resina frigida*, and consisted only of the former deprived of its humid parts.

COLOQUINTIDA, in botany. See CUCUMIS.

COLORATURA, in music, denotes all manner of variations, trillos, diminutions, &c. serving to make a song agreeable.

COLORNO, a town of Italy, in the Parmazan, near the river Po, eight miles from Parma. The duke of Parma has a pleasure-house here, one of the most delightful seats in all Italy, and the gardens are very fine. E. Long. 9. 15. N. Lat. 44. 54.

COLOSSAE, or COLOSEAE (anc. geog.), a considerable town of Phrygia Magna, in which the Lycus falls into a gulph, and at the distance of five stadia emerges again, and runs into the Meander (Herodotus). Others say, the genuine name is *Colassae*, and the people *Colassenses*, to whom St Paul wrote an epistle: Strabo calls them *Colosseni*. In Nero's time the town was destroyed by an earthquake (Orosius).

COLOSSUS, a statue of enormous or gigantic size. The most eminent of this kind was the Colossus of Rhodes; a statue of Apollo, so high, that ships passed with full sails betwixt its legs. It was the workmanship of Chares, a disciple of Lysippus; who spent 12 years in making it: it was at length overthrown by an earthquake, after having stood 1360 years. Its height was sixscore and six feet: there were few people could fathom its thumb, &c. When the Saracens became possessed of the island, the statue was found prostrate on the ground: they sold it to a Jew, who loaded 900 camels with the brass.

The basis that supported it was a triangular figure; its extremities were sustained with 60 pillars of marble.

There was a winding-stair-case to go up to the top of it; from whence one might discover Syria, and the ships that went into Egypt, in a great looking-glass, that was hung about the neck of the statue. Among the antiquities of Rome, there are seven famous Colossuses: two of Jupiter, as many of Apollo, one of Nero, one of Domitian, and one of the Sun.

COLOSTRUM, the first milk of any animal after bringing forth young, called *beestings*. It is remarkable that this milk is generally cathartic, and purges the meconium; thus serving both as an aliment and medicine.

An emulsion prepared with turpentine dissolved with the yolk of an egg, is sometimes called by this name.

COLOSWAR, a large and celebrated town of Transylvania, where the senates have their meetings. It is seated on the river Samos, in E. Long. 22. 45. N. Lat. 46. 53.

COLOUR, in physics, a property inherent in light, by which, according to the various sizes of its parts, or from some other cause, it excites different vibrations in the optic nerve; which propagated to the sensorium, affect the mind with different sensations. See CHROMATICS and OPTICS.

COLOUR, in painting, is applied both to the drugs, and to the tints produced by those drugs variously mixed and applied.

The principal colours used by painters are red and white lead, or cerufs; yellow and red ochres; several kinds of earth, umbre, orpiment, lamp-black, burnt ivory,

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Colour.

Colour. ivory, black lead, cinnabar or vermillion, gamboge, lacca, blue and green ashes, verdigris, bistre, bice, smalt, carmine, ultramarine: each of which, with their uses, &c. are to be found under their proper articles.

Of these colours some are used tempered with gum-water: some ground with oil; others only in fresco; and others for miniature.

Fainters reduce all the colours they use under these two classes, of dark and light colours: dark colours are black, and all others that are obscure and earthy, as umbre, bistre, &c.

Under light colours are comprehended white, and all that approach nearest to it.

Painters also distinguish colours into simple and mineral.

Under simple colours they rank all those which are extracted from vegetables, and which will not bear the fire; as the yellow made of saffron, French berries, lacca, and other tinctures extracted from flowers, used by limners, illuminers, &c.

The mineral colours are those which being drawn from metals, &c. are able to bear the fire, and therefore used by enamellers. Changeable and permanent colours is another division, which, by some, is made of colours.

Changeable colours are such as depend on the situation of the objects with respect to the eye, as that of a pigeon's neck, taffeties, &c. the first, however, being attentively viewed by the microscope, each fibre of the feathers appears composed of several little squares, alternately red and green, so that they are fixed colours.

Water COLOURS, are such as are used in painting with gum-water or size, without being mixed with oil.

Incapacity of distinguishing COLOURS. Of this extraordinary defect in vision, we have the following instances in the Philosophical Transactions for 1777. One of the persons lived at Maryport in Cumberland. The account was communicated by Mr Huddart to Dr Priestley, and is as follows. "His name was Harris, by trade a shoe-maker. I had often heard from others, that he could discern the form and magnitude of all objects very distinctly, but could not distinguish colours. This report having excited my curiosity, I conversed with him frequently on the subject. The account he gave was this: That he had reason to believe other persons saw something in objects which he could not see; that their language seemed to mark qualities with precision and confidence, which he could only guess at with hesitation, and frequently with error. His first suspicion of this arose when he was about four years old. Having by accident found in the street a child's stocking, he carried it to a neighbouring house to inquire for the owner: he observed the people called it a *red* stocking, though he did not understand why they gave it that denomination, as he himself thought it completely described by being called a *stocking*. This circumstance, however, remained in his memory, and, together with subsequent observations, led him to the knowledge of his defect.

"He also observed, that when young, other children could discern cherries on a tree, by some pretend-

ed difference of colour, though he could only distinguish them from the leaves by the difference of their size and shape. He observed also, that by means of this difference of colour they could see the cherries at a greater distance than he could, though he could see other objects at as great a distance as they, that is, where the sight was not assisted by the colour. Large objects he could see as well as other persons; and even the smaller ones, if they were not enveloped in other things, as in the case of cherries among the leaves.

"I believe he could never do more than guess the name of any colour; yet he could distinguish white from black, or black from any light or bright colour. Dove or straw colour he called *white*, and different colours he frequently called by the same name; yet he could discern a difference between them when placed together. In general, colours of an equal degree of brightness, however they might otherwise differ, he confounded together. Yet a striped ribbon he could distinguish from a plain one; but he could not tell what the colours were with any tolerable exactness. Dark colours, in general, he often mistook for black; but never imagined white to be a dark colour, nor dark to be a white colour.

"He was an intelligent man, and very desirous of understanding the nature of light and colours; for which end he had attended a course of lectures in natural philosophy.

"He had two brothers in the same circumstances as to sight; and two other brothers and sisters, who, as well as their parents, had nothing of this defect.

"One of the first mentioned brothers, who is now living, I met with at Dublin, and wished to try his capacity to distinguish the colours in a prism; but not having one by me, I asked him, whether he had ever seen a rainbow? he replied, He had often, and could distinguish the different colours; meaning only, that it was composed of different colours, for he could not tell what they were.

"I then procured, and showed him a piece of ribbon: he immediately, and without any difficulty, pronounced it a striped, and not a plain, ribbon. He then attempted to name the different stripes: the several stripes of white he uniformly and without hesitation called white: the four black stripes he was deceived in; for three of them he thought brown, though they were exactly of the same shade with the other, which he properly called black. He spoke, however, with diffidence, as to all those stripes; and it must be owned, that the black was not very distinct: the light green he called yellow; but he was not very positive: he said, "I think this is what you call yellow." The middle stripe, which had a slight tinge of red, he called a sort of blue. But he was most of all deceived by the orange colour: of this he spoke very confidently, saying, "This is the colour of grass; this is green." I also showed him a great variety of ribbons, the colour of which he sometimes named rightly, and sometimes as differently as possible from the true colour.

"I asked him, whether he imagined it possible for all the various colours he saw to be mere difference of light and shade; and that all colours could be composed of these two mixtures only? With some hesitation he

Colour.

Colour. he replied, No, he did imagine there was some other difference.

"It is proper to add, that the experiment of the striped ribbon was made in the day-time, and in a good light."

COLOURS for staining different kinds of Stones. See CHEMISTRY, n^o 753.

COLOUR, in dyeing. See DYEING.

COLOUR of Plants, is an attribute found to be very variable. Different colours are observed, not only in different individuals of the same species, but likewise in different parts of the same individual. Thus, marvel of Peru, and sweet-William, have frequently petals of different colours on the same plant. Three or four different colours are frequently found upon the same leaf or flower; as on the leaves of the amaranthus, tricolor, and the flowers of the tulip, auricula, three coloured violet, and others. To produce the most beautiful and striking variety of colours in such flowers, is the principal delight and business of the florist.

The primitive colours, and their intermediate shades or graduations enumerated by botanists, are as follow:

Water-colours, *hyalinus*.

WHITE.

Lead-colour, *cinereus*.

BLACK, *niger*.

Brown, *fuscus*.

Pitch-black, *ater*.

YELLOW, *luteus*.

Straw colour, *flavus*.

Flame-colour, *fulvus*.

Iron colour, *gilvus*.

RED.

Flesh-colour, *incarnatus*.

Scarlet, *coccineus*.

PURPLE.

Violet-colour, *caruleo-purpureus*.

BLUE, *caruleus*.

GREEN.

These colours seem to be appropriated to particular parts of the plant. Thus, white is most common in roots, sweet berries, and the petals of spring flowers. Water-colour, in the filaments and styles. Black, in the roots and seeds; rarely in the seed-vessel, and scarce ever to be found in the petals. Yellow is frequently in the antheræ or tops of the stamina; as likewise in the petals of autumnal flowers, and the compound-legulated flowers of Linnæus. Red is common in the petals of summer flowers, and in the acid fruits. Blue and violet-colour, in the petals. Green, in the leaves and calyx, but rarely in the petals. In the interchanging of colours, which in plants is found to depend upon differences in heat, climate, soil, and culture, a sort of elective attraction is observed to take place. Thus, red is more easily changed into white and blue: blue into white and yellow; yellow into white; and white into purple. A red colour is often changed into a white, in the flowers of heath, mother of thyme, betony, pink, viscous campion, *cucubalus*, trefoil, orchis, fox-glove, thistle, cudweed, faw-wort, rose, poppy, fumitory, and geranium. Red passes into blue in pimpernel. Blue is changed into white in bell-flower, greek-valerian, bindweed, columbine, violet,

vetch, milk-wort, goat's rue, viper's bugloss, comfrey, borage, hyssop, dragon's head, scabious, blue-bottle, and succory. Blue is changed into yellow in crocus. Yellow passes easily into white in melilot, agrimony, mullein, tulip, *blattaria*, or moth-mullein, and corn marigold. White is changed into purple in wood-sorrel, thorn apple, pease, and daisy.

Although plants are sometimes observed to change their colour upon being moistened with coloured juices, yet that quality in vegetables seems not so much owing to the nature of their nourishment, as to the action of the internal and external air, heat, light, and the primitive organization of the parts. In support of this opinion, we may observe with Dr Grew, that there is a far less variety in the colours of roots than of the other parts of the plant; the pulp, within the skin, being usually white, sometimes yellow, rarely red. That this effect is produced by their small intercourse with the external air appears from this circumstance, that the upper parts of roots, when they happen to stand naked above the ground, are often dyed with several colours: thus the tops of sorrel roots turn red; those of turnips, mullein, and radishes, purple; and many others green: whilst those parts of the same roots which lie more under ground are commonly white. The green colour is so proper to leaves, that many, as those of sage, the young sprouts of St John's wort, and others which are reddish when in the bud, acquire a perfect green upon being fully expanded. In like manner, the leaves of the sea-side grape, *polygonum*, which when young are entirely red, become, as they advance in growth, perfectly green, except the middle and transverse ribs, which retain their former colour.

As flowers gradually open and are exposed to the air, they throw off their old colour, and acquire a new one. In fact, no flower has its proper colour till it is fully expanded. Thus the purple stock-julyflowers are white or pale in the bud. In like manner bachelor's buttons, blue-bottle, poppy, red daisies, and many other flowers, though of divers colours when blown, are all white in the bud. Nay, many flowers change their colours thrice successively; thus, the very young buds of lady's looking-glass, bugloss, and the like, are all white; the larger buds purple, or murrey; and the open flowers blue.

With respect to the colours of the juices of plants, we may observe, that most resinous gums are tintured; some, however, are limpid; that which drops from the domestic pine is clear as rock-water. The milk of some plants is pale, as in burdock; of others white, as in dandelion, euphorbium, and scorzonera; and of others yellow, as in lovage, and greater celandine. Most mucilages have little colour, taste, or smell. Of all the colours above enumerated, green is the most common to plants, black the most rare.

Colour being a quality in plants so apt to change, ought never to be employed in distinguishing their species. These ought to be characterised from circumstances not liable to alteration by culture or other accidents. The same inconstancy of colour observed in the flowers, is likewise to be found in the other parts of plants. Berries frequently change from green to red, and from red to white. Even in ripe fruits, the colour, whether white, red, or blue, is apt to vary; particularly

Colour.

particularly in apple, pear, plum, and cherry trees. Seeds are more constant in point of colour than the vessel which contains them. In the seeds, however, of the poppy, oats, pea, bean, and kidney-bean, variations are frequently observed. The root, too, although not remarkably subject to change, is found to vary in some species of carrot and radish. Leaves frequently become spotted, as in a species of orchis, hawk-weed, ranunculus, knot-grass, and lettuce; but seldom relinquish their green colour altogether. Those of some species of amaranthus, or flower-gentle, are beautifully coloured. The spots that appear on the surface of the leaves are of different colours, liable to vary, and not seldom disappear altogether. The leaves of officinal lung-wort, and some species of sow-bread, sorrel, trefoil, and ranunculus, are covered with white spots. Those of dog's-tooth violet, with purple and white. Those of several species of ranunculus, and orchis, with black and purple. Those of amaranthus, tricolor, with green, red, and yellow. Those of ranunculus, acris, and a species of bog-bean, with red or purple. The under surface of the leaves of some species of pimpernel and the sea-plantain is marked with a number of dots or points; a white line runs through the leaves of Indian reed, black-berried heath, and a species of Canary grass: and the margin or brim of the leaf, in some species of box, honey-suckle, ground-ivy, and the ever-green oak, is of a silver-white colour. The whole plant is often found to assume a colour that is unnatural or foreign to it. The varieties in some species of eryngo, mug-wort, orrach, amaranthus, purslane, and lettuce, furnish examples.

Such being the inconstancy of colour in all the parts of the plant, specific names derived from that quality are, very properly, by Linnæus, deemed erroneous; whether they respect the colour of the flower, fruit, seeds, root, leaves, or express in general the beauty or deformity of the entire plant, with a particular view to that circumstance. Of this impropriety committed by former botanists, Linnæus himself is not always guiltless. Thus the two species of *sarracena*, or the side-saddle flower, are distinguished by the colour of their petals into the yellow and purple *sarracena*; although the shapes and figure of the leaves afforded much more constant as well as striking characters. The same may be said of his *lupinus albus* and *luteus*: *refeda alba*, *glauca*, and *lutea*; *angelica atro-purpurea*; *dictamnus albus*; *lamium album*; *selago coccinea*; *fidia alba*; *passiflora rubra*, *lutea*, *incarnata*, and *cœrulea*; and of many others, in which the specific name is derived from a character or quality that is so liable to vary in the same species.

We shall conclude this article with observing, that of all sensible qualities, colour is the least useful in indicating the virtues and powers of vegetables. The following general positions on this subject are laid down by Linnæus, and seem sufficiently confirmed by experiment. A yellow colour generally indicates a bitter taste; as in gentian, aloe, celandine, turmeric, and other yellow flowers. Red indicates an acid or sour taste; as in cranberries, barberries, currants, raspberries, mulberries, cherries; the fruit of the rose, sea-buckthorn, and service-tree. Herbs that turn red towards autumn, have likewise a sour taste; as sorrel, wood-

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sorrel, and bloody dock. Green indicates a crude alkaline taste, as in leaves and unripe fruits. A pale colour denotes an insipid taste, as in endive, asparagus, and lettuce. White promises a sweet luscious taste; as in white currants and plums, sweet apples, &c. Lastly, black indicates a harsh, nauseous, disagreeable taste; as in the berries of deadly night shade, myrtle-leaved sumach, herb-christopher, and others; many of which are not only unpleasant to the taste, but pernicious and deadly in their effects.

To be ascertained of the acid or alkaline property of any plant, express some of the juice, and rub it upon a piece of blue paper; which, if the plant in question is of an acid nature, will turn red; if of an alkaline, green. For the methods of extracting colours from the different parts of plants, see the article *COLOUR-Making*.

COLOUR of the Human Species, Difference of. See COMPLEXION.

COLOUR, in heraldry. The colours generally used in heraldry are, red, blue, black, green, and purple; which the heralds call *gules*, *azure*, *sable vert* or *sinople*, and *purpure*; tawny, or tawny, and sanguine, are not so common: as to yellow and white, called *or* and *argent*, they are metals, not colours.

The metals and colours are sometimes expressed in blazon by the names of precious stones, and sometimes by those of planets or stars. See BLAZONING.

Cenotaphus is said first to have invented the distinction of colours, to distinguish the gundillæ of combatants of the Circensian games; the green for those who represented the earth, and blue for those who represented the sea.

COLOURS, in the military art, include the banners, flags, ensigns, &c. of all kinds, borne in the army or fleet. See FLAG and STANDARD.

COLOURS, in the Latin and Greek churches, are used to distinguish several mysteries and feasts celebrated therein.

Five colours only are regularly admitted into the Latin church: these are white, green, red, violet, and black. The white is for the mysteries of our Saviour, the feast of the Virgin, those of the angels, saints, and confessors; the red is for the mysteries and solemnities of the holy sacrament, the feasts of the apostles and martyrs; the green for the time between pentecost and advent, and from epiphany to septuagesima; the violet in advent and Christmas, in vigils, rogations, &c. and in votive masses in time of war; lastly, the black is for the dead, and the ceremonies thereto belonging.

In the Greek church, the use of colours is almost abolished, as well as among us. Red was, in the Greek church, the colour for Christmas and the dead, as black among us.

To COLOUR Stranger's Goods, is when a freeman allows a foreigner to enter goods at the custom-house in his name.

COLOUR-Making, the art of preparing the different kinds of colours used in painting.

This art properly belongs to chemistry; and is one of the most curious, though least understood, parts of it. The principles on which colour-making depends are entirely different from those on which the theory of other parts of chemistry is founded; and the practical

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Colour.

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cal part being in the hands of those who find it their interest to conceal their methods as much as possible, it thence happens, that there is not only no distinct theory of this art, but scarce a single good receipt for making any one colour hath ever appeared.

1
Division of colours into opaque and transparent.

The first general division of colours is into opaque and transparent. By the first are meant such colours as, when laid over paper, wood, &c. cover them fully so as to efface any other painting or stain that might have been there before; the others are of such a nature as to leave the ground on which they are laid visible through them. Of the first kind are white-lead, red-lead, vermilion, &c.; of the latter kind are the colours used for illuminating maps, &c.

2
Oil and water colours.

Another division is into oil-colours and water-colours; by which is meant, such as are appropriated to painting in oil and in water. Most of those which are proper for painting in water, are also proper for being used in oil. There is, however, this remarkable difference betwixt colours when mixed with water and with oil, that such as are quite opaque in water will become perfectly transparent in oil. Thus, blue verditer, though exceedingly opaque in water, if ground with oil, seems totally to dissolve, and will become very transparent. The same thing happens to such colours as have for their basis the calx of tin, alabaster, or calcareous earth. The most perfectly opaque colours in oil are such as have lead, mercury, or iron, for their basis: to the latter, however, Prussian blue is an exception: for though the basis of that colour is iron, it proves quite transparent when ground with oil. In water-colours, those prepared from metals, Prussian blue alone excepted, are always opaque; from vegetables or animals, transparent. Coals, however, whether vegetable or animal, are opaque both in water and oil.

3
Simple and compound ones.

Colours, again, may be considered as either simple or compounded. The simple ones are such as require nothing to be superadded to them, in order to make a full strong colour, without regarding whether they are formed of many or few ingredients: and in this view, white-lead, red-lead, vermilion, calces of iron, &c. are simple colours. The compound ones are formed by the union of two or more colouring substances; as blue and yellow united together to form a green, red and yellow to form an orange, a white earth or calx with the red colour of cochineal or brazil to form a lake, &c.; and thus carmine, lake, rose-pink, Dutch-pink, English-pink, &c. are compound colours.

4
True and false colours.

The last and most important division of colours is into true and false. By the former are meant those which retain their colour under every possible variety of circumstances, without fading in the least; the other are such as do not; but either lose their colour altogether, or change to some other. What is chiefly apt to affect colours, is their being exposed to the sun in summer, and to the cold air in winter: but to this there is one exception, *viz.* white-lead; which, when ground with oil, retains its whiteness if exposed to the weather, but degenerates into a brownish or yellowish colour if close kept. In water this substance is very apt to lose its colour, whether exposed to the air or not. The great desideratum in colour-making is to produce the first kind of colours, *viz.* such as will not fade by exposure to the weather; and indeed it is to

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be regretted, that the most beautiful are in general the least permanent. It may, for the most part, however, be expected, that the more simple any colour is, the less liable will it be to change upon exposure to the air.

The great difficulty of knowing *à priori* whether a colour will fade or not, is owing to our ignorance concerning the nature of colouring substances. With all our disadvantages, however, we may observe, that whatever change of colour is produced in any substance by exposure to the sun and air, that colour to which it changes will bid fair for being permanent, and therefore ought to be employed where it can be done.

Of these changes the instances are but very rare. One is in the purple of the ancients, which assumed its colour by exposure to the sun, and consequently was exceedingly permanent. Another is in the solution of silver: which, being mixed with chalk, the precipitate turns to purplish black where it is exposed to the sun. A third is in solutions of indigo by alkaline substances, which constantly appear green till exposed to the air by spreading them very thin, upon which they become almost instantaneously blue, and continue so ever after. Sometimes, though still more rarely, a very remarkable change of colour happens upon mixing two vegetable juices together. Almost the only instance of this we have on the authority of Mr George Forster, who informs us, that the inhabitants of Otaheite dye their cloth of a crimson colour, by mixing together the yellow juice of a small species of fig with the greenish juice of a kind of fern. But the most remarkable alterations of colour are effected by different metallic and saline solutions mixed with certain animal or vegetable substances; and with these the colour-maker will be principally conversant.

It is a common observation in chemistry, that acids mixed with blue vegetable juices turn them red, and alkalies green. It is equally certain, though not so generally known, that acids of all kinds generally tend to heighten red colours, so as to make them approach to the scarlet or true crimson: and alkalies to darken, or make them approach to blue or purple. Mixed, with yellow colours, acids also universally tend to brighten the yellow; and alkalies to turn it to an orange, and make it become more dull. But though this is very generally the case, we are not to expect that all acids are equally powerful in this respect. The nitrous acid is found to heighten the most of any, and the marine acid the least of the mineral ones. The vegetable, as might be expected, are less powerful than the mineral acids. Thus, if with a tincture of cochineal, either in water or spirit of wine, is mixed the pure nitrous acid, it will change the colour to an exceeding high orange or flame colour, which it will impart to cloth. If the vitriolic acid is used, a full scarlet, inclining to crimson rather than orange, is produced. With marine acid a true crimson colour, bordering on purple, is the consequence. Alkalies, both fixed and volatile, change the colour to a purple, which is brighter with the volatile than the fixed alkalies.

Here it is obvious, that whatever colours are produced by the mixtures of different substances together, the permanency of these colours can only be in proportion to the ability of such mixtures to resist the weather.

5
Instances of colours produced by exposure to the sun and air.

6
By the mixture of two vegetable juices.

7
Effects of acids and alkalies on colours.

8
Permanency of colours, by what determined.

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weather. Thus, suppose a high scarlet or orange colour is produced by means of spirit of nitre, it is plain that, was such a colour exposed to the air, it could remain no longer than the spirit of nitre which produced it remained. In proportion, therefore, as the spirit of nitre was exhaled into the air, or otherwise destroyed, it behoved the colour to fade, and at last to be totally destroyed; and thus, in proportion to the destructibility of the substances by which colours are produced, will be the disposition of such colours to fade, or the contrary. In this respect alkalies are much more destructible than acids, and consequently less proper for the preparation of colours. With regard to acids, the nitrous seems most destructible, the vitriolic less so, and the marine the least of all. From the extreme fixity of the phosphoric acid and sedative salt, perhaps they might be of service in preserving colours.

9
Opaque or transparent colours, how formed.

As all colours, whether derived from the animal or vegetable kingdom, must be extracted either by pure water or some other liquid menstruum, they cannot be used for the purposes of painting till the colouring substance is united with some earthy or solid matter, capable of giving it a *body*, as the workmen call it; and according to the nature of this substance, the colour will be transparent or otherwise. This basis ought to be of the most fixed and durable nature; unalterable by the weather, by acids, or by alkalies. It ought also to be of a pure white colour, and easily reducible into an impalpable powder. For this reason all earthy substances should be avoided as being acted upon by acids; and therefore, if any of these were added to heighten the colour, they would not fail to be destroyed, and their effect totally lost. Precipitates of lead, bismuth, &c. though exceedingly fine and white, ought also to be avoided, as being apt to turn black by exposure. The only substance to be chosen in preference to all others, is calx of tin, prepared either by fire or the nitrous acid. This is so exceedingly refractory as not only to be unalterable by alkalies, acids, or the sun and weather, but even by the focus of a very large burning mirror. It is besides white as snow, and capable of being reduced to an extreme degree of fineness, insomuch that it is made use of for polishing metalline speculums. For these reasons, it is the most proper basis for all fine colours. For coarse ones, the white precipitate of lead, mentioned under the article CHEMISTRY, n^o 703, will answer very well. It hath a very strong body, *i. e.* is very opaque, and will cover well; may be easily ground fine, and is much less apt to turn black than white lead; it is besides very cheap, and may be prepared at the small expence of 3d. per pound.

10
Calx of tin, the most proper basis for fine colours.

11
Precipitate of lead most proper for coarse ones.

If what we have just now observed is attended to, the general method of extracting colours from any vegetable or animal substance, and fixing them on a proper basis, must be very easily understood. For this purpose, a quantity of calx of tin is to be procured in proportion to the quantity of colour desired. This must be well rubbed in a glass mortar, with a little of the substance designed for brightening the colour, as alum, cream of tartar, spirit of nitre, &c. after which it must be dried, and left for some time, that the union between the two substances may be as perfect as possible. If the colour is to be a very fine one, suppose from cochineal, the colouring mat-

ter must be extracted with spirit of wine without heat. When the spirit is sufficiently impregnated, it is to be poured by little and little upon the calx, rubbing it constantly, in order to distribute the colour equally through all parts of the calx. The spirit soon evaporates, and leaves the calx coloured with the cochineal. More of the tincture is then to be poured on, rubbing the mixture constantly as before; and thus, with proper management, may very beautiful colours, not inferior to the best carmine, be prepared at a moderate expence. If, instead of cochineal, we substitute brazil-wood, turmeric, logwood, &c. different kinds of red, yellow, and purple, will be produced. For the coarser colours, aqueous decoctions are to be used in a similar manner; only as these are much longer of evaporating than the spirit of wine, very little must be poured on at a time, and the colours ought to be made in large quantity, on account of the tediousness of the process.

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Hitherto we have considered only the effects of the pure and simple salts, *viz.* acids and alkalies, on different colours; but by combining the acids with alkalies, earths, or metals, these effects may be varied almost in *infinitum*; neither is there any rule yet laid down by which we can judge *a priori* of the changes of colour that will happen on the admixture of this or that particular salt with any colouring substance. In general, the perfect neutrals act weakly; the imperfect ones, especially those formed from metals, much more powerfully. Alum and sal ammoniac considerably heighten the colour of cochineal, brazil, turmeric, fustic, madder, logwood, &c. The same thing is done, though in a less degree, by common salt, Glauber's salt, saltpetre, and many other neutrals. Solutions of iron in all the acids strike a black with every one of the above-mentioned substances; and likewise with sumach, galls, and other astringents. Solutions of lead, or saccharum saturni, universally debase red colours to a dull purple. Solution of copper changes the purple colour of logwood to a pretty good blue; and, in general, solutions of this metal are friendly to blue colours. The effects of solutions of gold, silver, and mercury, are not so well known: they seem to produce dark colours of no great beauty. The most powerful solution, however, with regard to a great number of colours, is that of tin, made in aqua regia. Hence we may see the fallacy of Mr Delaval's hypothesis concerning colours*, that the least refrangible ones are produced by the most dense metals: for tin, which hath the least density of any metal, hath yet, in a state of solution, the most extraordinary effects upon the least refrangible colours as well as those that are most so. The colour of cochineal is changed by it into the most beautiful scarlet; a similar change is made upon the colouring matter of gum-lac. Brazil-wood is made to yield a fine purplish crimson; logwood, a beautiful dark purple; turmeric, fustic, weld, and all yellow-colouring woods and flowers, are made to communicate colours far more beautiful than can be got from them by any other method. The blue colour of the flowers of violets, eye-bright, iris, &c. are heightened so as to equal, if not excel, the blue produced by a solution of copper in volatile alkali. In short, this solution seems to be of much more extensive use in colour-making,

13
Effects of different kinds of salts.

14
Solution of tin the most powerful.

* See Chromatics, n^o 8.

Colour-making.

when properly applied, than any thing hitherto thought of. It is not, however, universally serviceable. The colour of madder it totally destroys, and likewise that of safflower, changing them both to a dull orange. It likewise spoils the colour of archil: and what is very remarkable, the fine red colour of tincture of roses made with oil of vitriol, is by solution of tin changed to a dirty green.

15
Directions
for the
choice of
colouring
materials.

The most important consideration in colour making is to make choice of such materials as produce the most durable colours; and if these can be procured, an ordinary colour from them is to be preferred to a bright one from those which fade sooner. In what the difference consists between the colours that fade and those which do not, is not known with any degree of certainty. From some appearances it would seem, that those substances which are most remarkable for keeping their colour, contain a viscous glutinous matter, so combined with a resinous one as to be soluble both in water and spirit of wine. The most durable red colour is prepared from gum-lac. This is very strongly resinous, though at the same time so far glutinous, that the colouring-matter can be extracted from it by water. Next to gum-lac are madder roots and cochineal. The madder is an exceedingly penetrating substance, inasmuch that, when given to animals along with their food, it tinges their bones of a deep red colour. Its colouring-matter is soluble both in water and spirit of wine. Along with the pure red, however, there is in madder a kind of viscous astringent substance, of a bark brown colour, which seems to give the durability to the whole. The colouring-matter of cochineal, though soluble both in water and spirit of wine, is very tenacious and mucilaginous, in which it bears some resemblance to the *purpura* of the ancients, which kept its colour exceedingly well. Where the colours are fugitive, the tinging substance seems to be too resinous or too mucilaginous. Thus the colours of brazil, turmeric, &c. are very resinous, especially the latter; inasmuch that the colouring-matter of turmeric can scarcely be extracted by water. Both these are perishable, though beautiful colours; and much more are the red, purple, and blue flowers, commonly to be met with. These seem to be entirely mucilaginous without the least quantity of resinous matter. The yellow flowers are different, and in general keep their colour pretty well. Whether it would be possible, by adding occasionally a proper quantity of gum or resin, to make the fugitive colours more durable, hath not yet been tried, but seems to have some probability. What tends a little to confirm this, is a process given by Mr Hellot for imparting durability to the colour of brazil. It consists only in letting decoctions of the wood stand for some time in wooden casks till they grow stale and *ropy*. Pieces of woollen cloth now dyed in the liquor acquired a colour so durable, that they were not in the least altered by exposure to the air during four months in the winter season. Whether this change in the durability of the colour was effected by the ropiness following the fermentation, or by some other cause, or whether the experiment can be at all depended upon, must be referred to future observation.

16
Mr Hellot's
method of
improving
the durability
of brazil-wood.

17
Preparation
of different
colours.

Having thus collected all that can as yet be de-

pended upon for establishing a general theory of colour-making, we shall now proceed to give an account of the different pigments generally to be met with in the colour-shops.

Colour-making.

18
1. *Black.* These are lamp-black, ivory-black, blue-black, and Indian-ink. The first is the finest of what are called the foot-blacks, and is more used than any other. Its preparation is described in the Swedish Transactions for the year 1754, as a process dependent on the making of common resin: the impure resinous juice collected from incisions made in pine and fir trees, is boiled down with a little water, and strained whilst hot through a bag; the dregs and pieces of bark left in the strainer are burnt in a low oven, from which the smoke is conveyed through a long passage into a square chamber, having an opening on the top on which is a large sack made of thin woollen stuff: the foot, or lamp-black, concretes partly in the chamber, from whence it is swept out once in two or three days, and partly in the sack, which is now and then gently struck upon, both for shaking down the foot and for clearing the interstices betwixt the threads, so as to procure a sufficient draught of air through it. In this manner lamp-black is prepared at the turpentine houses in England, from the dregs and refuse of the resinous matters which are there manufactured.

Lamp-black.

19
On this subject Dr Lewis hath some curious observations. "The foot (says he) arising in common chimneys, from the more oily or resinous woods, as the fir and pine, is observed to contain more dissoluble matter than that from the other woods: and this dissoluble matter appears, in the former, to be more of an oily or resinous nature than in the latter; spirit of wine extracting it most powerfully from the one, and water from the other. The oiliness and solubility of the foot seeming therefore to depend on those of the subject it is made from, it has been thought that lamp-black must possess these qualities in a greater degree than any kind of common foot. Nevertheless, on examining several parcels of lamp-black, procured from different shops, I could not find that it gave any tincture at all, either to spirit or to water.

Dr Lewis's
observations.

"Suspecting some mistake or sophistication, or that the lamp-black had been burnt or charred, as it is to fit it for some particular uses, I prepared myself some foot from linseed oil, by hanging a large copper pan over the flame of a lamp to receive its smoke. In this manner the more curious artists prepare lamp-black for the nicer purposes; and from this collection of it from the flame of a lamp, the pigment probably received its name. The foot so prepared gave no tincture either to water or to spirits, any more than the common lamp-black of the shops. I tried different kinds of oily and resinous bodies with the same event; even the foot obtained from fish-oils and tallow did not appear to differ from those of the vegetable-oils and resins. They were all of a finer colour than the lamp-black commonly sold.

"Some foot was collected in like manner from fir and other woods, by burning small pieces of them slowly under a copper-pan. All the foots were of a deeper black colour than those obtained from the same kinds of woods in a common chimney; and very little, if at all, inferior to those of the oils: they gave only

Colour-making.

a just discernible tincture to water and spirit, while the soots of the chimney imparted a strong deep one to both. The soot of mineral bitumens, in this close way of burning, appears to be of the same qualities with those of woods, oils, and resins: in some parts of Germany, great quantities of good lamp-black are prepared from a kind of pit-coal.

"It appears, therefore, that the differences of soots do not depend altogether on the qualities of the subjects, but in a great measure on the manner in which the subject is burnt, or the soot caught. The soots produced in common chimneys, from different kinds of wood, resinous and not resinous, dry and green, do not differ near so much from one another, as those which are produced from one kind of wood in a common chimney, and in the confined way of burning above mentioned."

20
Ivory-black.

Ivory-black is prepared from ivory or bones burnt in a close vessel. This, when finely ground, forms a more beautiful and deeper colour than lamp-black; but in the common methods of manufacturing, it is so much adulterated with charcoal dust, and so grossly levigated, as to be unfit for use. An opaque deep black for water-colours, is made by grinding ivory-black with gum-water or with the liquor which settles from the whites of eggs after they have been suffered to stand a little. Some use gum-water and the whites of eggs together, and report, that a small addition of the latter makes the mixture flow more freely from the pencil, and improves its glossiness. It may be observed, however, that though ivory-black makes the deepest colour in water as well as in oil-painting, yet it is not on this account always to be preferred to other black pigments. A deep jet-black colour is seldom wanted in painting; and in the lighter shades, whether obtained by diluting the black with white bodies, or by applying it thin on a white ground, the particular beauty of the ivory-black is in a great measure lost.

21
Blue-black.

Blue-black is said to be prepared from the burnt stalks and tendrils of the vine. These, however, the colour-makers seldom give themselves the trouble of procuring, but substitute in its place a mixture of ivory-black and the common blue used for clothes.

22
Indian-ink.

Indian-ink is an excellent black for water-colours. It hath been discovered by Dr Lewis to consist of a mixture of lamp-black and common glue. Ivory-black, or charcoal, he found to answer equally well, provided they were levigated to a sufficient degree of fineness, which indeed requires no small trouble.

23
White colours.

2. *White.* The white colours commonly to be met with are, white-flake, white-lead, calcined hartshorn, pearl-white, Spanish-white, egg-shell white, and magistery of bismuth. The flake-white and white-lead are properly the same. The preparation of the former is kept a secret; the method of preparing the latter is described under CHEMISTRY, n° 875. These are the only whites that can be used in oil, all the rest being transparent unless they are laid on with water. Calcined hartshorn is the most useful of the earthy whites, as being the least alkaline. Spanish-white is only finely prepared chalk. Pearl-white is made from oyster-shells; and egg-shell white from the shells of eggs. All these, by their attraction for acids, must necessarily destroy such colours as have any acid or

metallic salt in their composition. The magistery of bismuth is apt to turn black, as are also flake-white and white-lead, when used in water. The white precipitate of lead recommended under CHEMISTRY, n° 703, is greatly superior as a water-colour to all these; being perfectly free of any alkaline quality, and not at all apt to lose its own colour, or to injure that of other substances.

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3. *Red.* The red colours used in painting are of two sorts; viz. those which incline to the purple, and such as are of a full scarlet and tend rather to the orange. The first are carmine, lake, rose-pink, red-ochre, and Venetian-red. The second are vermillion, red-lead, scarlet-ochre, common Indian-red, Spanish-brown, and terra di Sienna, burnt.

24

We have already (n° 12.) laid down some general rules for the preparation of carmine and lake. Particular receipts have been delivered with the greatest confidence for making these fine colours; but all of them must necessarily prove ineffectual, because an earthy basis is recommended for striking the colour upon; from the principles of chemistry, however, we are certain, that if aquafortis, or solution of tin, is made use of for brightening a colour made with any earthy basis, it must infallibly be destroyed by that basis, by reason of its alkaline quality. Carmine is the brightest and most beautiful red colour known at present; the best comes from France. Lake differs from it in being capable of mixture with oil; which carmine is not, unless with great difficulty. The former is also much more inclined to purple than carmine. This last quality, however, is reckoned a defect; and accordingly, the more that lake approaches to the scarlet or true crimson, the more it is valued. On dropping solution of tin into an aqueous tincture of brazil-wood, a beautiful precipitate falls, of a purplish crimson colour. This may be very well substituted in place of the dearer lakes on many occasions.

Rose-pink is a very beautiful colour, inclining more to the purple than scarlet. It seems to be made of chalk, coloured with a decoction of brazil-wood, heightened by an alkaline salt; for which reason it is exceedingly perishable, and but little esteemed. The colour might be made much more durable as well as better, by employing for a basis the white precipitate of lead above-mentioned, and brightening it with solution of tin.

Red ochre and Venetian red differ in nothing from the colcothar of vitriol well calcined. The calces of iron may be made to appear either purplish, or inclining to the scarlet, according to the manner in which the calcination is performed. If the matter is perfectly deprived of its phlogiston, and subjected to an intense fire, it always turns out red: but the mixture of a small quantity of inflammable matter gives it a purplish cast. Hence various paints are kept in the shops under different names which yet differ from each other only in the slight circumstance above mentioned: and such are the scarlet-ochre, Spanish-brown, and terra di Sienna burnt. It is remarkable, that the calces of iron never show their colour till they become cold. Colcothar of vitriol, while hot, always appears of a very dark dusky purple.

Of the preparation of vermillion and red lead, an account is given under the article CHEMISTRY, n° 1213, 1404. These are very durable colours; the first is the best

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best red used in oil painting, but does not answer well in water; the other is rather an orange: and, like other preparations of lead, is in some case apt to turn black.

25
Orange colours.

4. *Orange*. The only true orange-coloured paints are red orpiment and orange lake. The first is a sublimate formed of arsenic and sulphur; the other may be prepared from turmeric infused in spirit of wine, having its colour struck upon calx of tin, and brightened by a solution of that metal. All the shades of orange, however, may be extemporaneously prepared by mixing red and yellow colours together, in due proportions.

26
Yellow colours.

5. *Yellow*. The yellow paints most commonly in use are, king's-yellow, Naples-yellow, Dutch-pink, English-pink, masticot, common orpiment, yellow-ochre, terra di Sienna unburnt, and Turbith-mineral.

King's-yellow is evidently an arsenical preparation. Its colour is exceedingly beautiful, but apt to fade; on which account, and its great price, it is seldom used.

Naples-yellow was for a long time thought to be a preparation of arsenic, but is now discovered to have lead for its basis. It is therefore apt to turn black and lose its colour, which makes it the less valuable. It is nevertheless used in preference to king's yellow, on account of its inferiority in price. This colour is particularly liable to be spoiled by iron when moist, and therefore should never be touched by that metal unless previously ground in oil.

Dutch-pink is said to be prepared by striking the colour of yellow berries upon finely levigated chalk. But of this there is great reason to doubt: the basis of Dutch-pink seems much more hard and gritty than chalk, and its colour more durable than those struck upon that earth usually are. Very good yellows may be prepared with the white precipitate of lead, formerly mentioned, by using either yellow berries, fustic, or any other substance capable of yielding that colour. English pink is paler than the Dutch, and keeps its colour greatly worse.

Masticot is prepared by calcining white-lead till it assumes a yellowish colour. It is not apt to change, but the colour is so dull that it is seldom used either in oil or water.

Common orpiment is a pretty bright greenish-yellow, prepared by subliming arsenic with sulphur. Its nauseous smell, which is greatly increased by grinding in oil, makes it very disagreeable; nor does it keep its colour for any length of time. That kind of orpiment least inclined to green is to be preferred for the purposes of painting.

Yellow-ochre and terra di Sienna, are ferruginous earths, capable of becoming red by calcination. Green vitriol precipitated by lime may be advantageously substituted to either of them. See CHEMISTRY, n° 699.

Turbith mineral is but little used in painting, though its fine yellow colour seems greatly to recommend it. This preparation is in all probability very durable; and should seem therefore worthy of a preference either to king's or Naples yellow. The method of preparing it is described under CHEMISTRY, n° 705.

Gamboge is a paint that can only be used in water, and is the most common yellow made use of for co-

louring maps, &c. but for this it is not very proper, being neither quite transparent nor very durable.

6. *Green*. The only simple green colour that hath a tolerable degree of brightness is verdigrease, or preparations of it. This, however, though a very beautiful colour, is far from being durable. It is improved in colour, though not in durability, by dissolution and crystallization in distilled vinegar; in which state it is called *distilled verdigrease*. A more durable water-colour is made by dissolving the verdigrease in cream of tartar, or rather the pure tartarous acid: but in oil this is found to be equally fugitive with the verdigrease itself. For an account of these preparations, see CHEMISTRY, n° 894.

Compound greens are either made of Prussian or some other blue, mixed with yellow; but in whatever way these colours can be compounded, the beauty of the green produced is greatly inferior to distilled, or even common, verdigrease. The tartarous solution of verdigrease, mixed with a little gamboge, is the best transparent green water-colour we have had an opportunity of trying; and a mixture of Prussian-blue and turbith-mineral is probably the best opaque one.

Sap-green is a simple colour, but exceedingly inferior to distilled verdigrease, or even to the tartarous solution of verdigrease with gamboge. It is prepared from the juice of unripe buckthorn berries evaporated to the consistence of a gum. Its green colour is greatly inclined to yellow. A kind of compound green has been sometimes used, called *Prussian-green*, which consists only of Prussian blue and yellow-ochre. It has no beauty, nor is it durable. It is prepared as Prussian-blue, only not pouring on any spirit of salt to dissolve the ochreous sediment which falls at the same time.

Another green sometimes used is called *terra verte*. This is a native earth, probably impregnated with copper. It is of a bluish green colour, much of that taint called *sea-green*. It is gritty, and therefore must be well levigated before it is used. Its colour is durable, but not very bright.

7. *Blue*. The blue colours are ultramarine, Prussian-blue, verditer, smalt, bice, and indigo. Of these the ultramarine is the finest, but its great price hinders its being much used. It is a preparation from lapis lazuli; is an exceeding bright colour, and never fades with whatever substance it is mixed. It is now, however, in a great measure superseded by Prussian blue, to the disadvantage of painting in general; as Prussian blue, though very beautiful, is far from being durable. For an account of its preparations see the article ULTRAMARINE.

The process for making Prussian blue is described, and its nature fully considered, under CHEMISTRY, n° 1163; so that it is sufficient here to observe, that Prussian blue is to be accounted of the best quality when it is deep, bright, and not inclined to purple. It ought to be tried by mixture with white lead, as the brightness of the colour will appear much more when diluted than when concentrated in the lumps of the blue itself.

The preparation of blue verditer is kept a secret, and the best chemists have been puzzled to find out the method. The colour is exceedingly bright, and has a

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Blue colours.

con-

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considerable tinge of green. A method of preparing a colour equally beautiful, and agreeing in all respects with what is sold in the shops, except that of effervescing with acids, we have found to be as follows: Dissolve copper in strong caustic alkali, until the liquid has assumed a very deep blue colour; and the deeper this colour is, the finer will your verditer be. When the menstruum has dissolved as much of the metal as it can take up, it is to be poured out into a broad and well glazed earthen pan, held over a very gentle fire; and from the moment it is put on the liquor is to be continually agitated with a wooden spatula, so that the liquor may be heated as equally as possible. The whole secret consists in properly regulating the degree of heat; for if it exceeds the due proportion ever so little, the verditer will turn out of a dirty green. The proper degree is about 90° of Fahrenheit's thermometer. In this gentle heat the alkali slowly evaporates; and in proportion to its doing so the verditer falls to the bottom. After it is once formed, freed from the alkaline liquor, and dried, it can bear the affusion of boiling water without the least injury. Dr Priestley, in his sixth volume, takes notice, that solution of copper in volatile alkali affords a blue precipitate by heat, but without taking notice of the requisites for its success. In making this preparation, it is necessary to dissolve copper in its metallic state; for the solution of any calx will not yield a blue but a green colour. This colour is durable in water, but dissolves in oil, and has then all the inconveniences of verdigrease above mentioned.

Smalt is glass-coloured with zaffre, a preparation † See Zaffre from cobalt †. It is commonly so grossly powdered and Smalt. that it cannot be used in painting, and its texture is so hard that it cannot easily be levigated. Its colour is exceedingly bright and durable; so that when finely levigated it is used instead of ultramarine. The most proper materials for levigating this substance seem to be the plates of M. Reaumur's porcelain recommended by Dr Lewis. See CHEMISTRY, n° 592, 599. For the preparation and qualities of bice, see the articles *ARMENUS Lapis* and *BICE*.

Indigo is but little used in painting either in oil or water, on account of the dulness of the colour. It requires no other preparation than being washed over. Its goodness is known by the darkness and brightness of the colour. See *INDIGO*.

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Purple colours.

8. *Purple*. The only simple colour of this kind used at present is colcothar of vitriol. A beautiful purple lake may be prepared from logwood by means of solution of tin; but this method of preparing colours is very little known as yet.

30
Brown colours.

9. *Brown*. The brown colours are, bistre, brown-ochre, Cologne-earth, umbre, and brown-pink. Under the articles *BISTRE* is given a process for making that colour, by infusing foot in water, pouring off the tincture, and then evaporating it to an extract; but Dr Lewis is of opinion, with Mr Landois in the French *Encyclopédie*, that the foot is either boiled in water, or ground with a little liquid of some kind into a smooth paste; it is then diluted with more water, and after standing for about half an hour till the grosser substance of the foot has settled, the liquor is poured off into another vessel, and set by for two or three days, that the finer parts may fall to the bottom, and this

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Dr Lewis's opinion concerning bistre.

fine matter is the bistre. This is a very useful colour in water, being exceedingly fine, durable, and not apt to spoil any other colours with which it is mixed. The brown pink is said to consist of chalk tinged with the colouring matter of fustic, heightened by fixed alkaline salts. It is therefore very perishable, and is seldom used. The other browns are a kind of ochreous earths; for a description of which see their proper articles.

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Having now considered most of the colouring substances usually to be met with in the shops, we shall next take notice of some attempts that have been made to produce all the different colours from vegetables, after the manner of lakes; which, though the methods hitherto tried have for the most part failed of success, may perhaps some time or other be found applicable to valuable purposes.

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Attempts to make lakes of all colours.

From infusions of astringent vegetables mixed with Black from green vitriol, is produced a deep black liquor of very astringents; extensive use in dyeing †. The substances which produce the deepest blacks are galls and logwood. When † See Dyeing. a decoction or infusion of the galls is dropped into a solution of the vitriol largely diluted with water, the first drops produce bluish or purplish red clouds, which soon mingling with the liquor, turn it uniformly of their own colour. It seems to be on the quality of the water that this difference in the colour depends. With distilled water, or the common spring-waters, the mixture is always blue. If we previously dissolve in the water the most minute quantity of any alkaline salt, too small to be discovered by any of the common means by which waters are usually tried, or if the water is in the least putrid, the colour of the mixture proves purple or reddish. Rain-water, caught as it falls from the clouds in an open field in clean glass-vessels, gives a blue; but such as is collected from the tops of the houses, grows purple with the mixture of vitriol and galls: from whence it may be presumed, that this last has contracted a putrid tendency, or received an alkaline impregnation, though so slight as not to be sensible on other ways of trial.

Both the purple and blue liquors, on adding more of the astringent infusion, deepen to a black, more or less intense according to the nature of dilution: if the mixture proves of a deep opaque blackness, it again becomes bluish or purplish when further diluted. If suffered to stand in this diluted state for two or three days, the colouring matter settles to the bottom in form of a fine black mud, which by slightly shaking the vessel, is diffused again through the liquor, and tinges it of its former colour. When the mixture is of a full blackness, this separation does not happen, or in a far less degree; for though a part of the black matter precipitates in standing, yet so much remains dissolved, that the liquor continues black. This suspension of the colouring substance, in the black liquid, may be attributed in part to the gummy matter of the astringent infusion increasing the consistence of the watery fluid; for the separation is retarded in the diluted mixture by a small addition of gum Arabic. If the mixture either in its black or diluted state is poured into a filter, the liquor passes through coloured; only a part of the black matter remaining on the filter. The filtered liquor on standing for some time becomes turbid and full of fine black flakes: being freed

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freed from these by a second filtration, it again puts on the same appearance; and thus repeatedly till all the colouring parts are separated, and the liquor has become colourless.

Dr Lewis, from whose Philosophical Commerce of Arts this account is taken, further informs us, that this colouring matter, when separated from the liquor and dried, appeared of a deep black, which did not seem to have suffered any change from the air by exposure for upwards of four months. Made red-hot, it glowed and burnt, but did not flame, and became a rusty brown powder, which was readily attracted by a magnetic bar; though in its black state the magnet had no action upon it. The vitriolic acid diluted with water and digested on the black powder, dissolved the greatest part of it, leaving only a very small quantity of whitish matter. Solution of pure fixed alkaline salt dissolved very little of it: the liquor received a reddish brown colour, and the powder became blackish brown. This residuum was attracted by the magnet after being red-hot, though not before: the alkaline tincture, passed through a filter, and mixed with a solution of green vitriol, struck a deep brownish black colour, nearly the same with that which results from mixing with the vitriolic solution, an alkaline tincture of galls.

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Black from
a combina-
tion of o-
ther co-
lours.

It hath also been attempted to produce black from a combination of other colours; as green may be produced from a mixture of blue and yellow. Mr le Blon, in his *Harmony of Colours*, gives a method of forming black, by mixing together the three colours called *primitive*, viz. blue, red, and yellow; and Mr Castel, in his *Opique des Couleurs*, published, in 1740, says that this compound black has an advantage, in painting, above the simple ones, of answering better for the darkening of other colours. Thus, if blue, by the addition of black, is to be darkened into the colour called *blue-black*, the simple blacks, according to him, if used in sufficient quantity to produce the requisite deepness, conceal the blue, while the compound blacks leave it distinguishable. Le Blon does not mention the proportions of the three colours necessary for producing black. Castel directs 15 parts of blue, five of red, and three of yellow; but takes notice, that these proportions are rather speculatively than practically just, and that the eye only can be the true judge; our colours being all very imperfect, and our pigments or other bodies of one denomination of colour being very unequal in their degree of intensity. He observes, that the pigment should all be of the deepest and darkest kind: and that, instead of taking one pigment for each colour, it is better to take as many as can be got; for the greater discord there is of heterogeneous and discordant drugs, the more true and beautiful, he says, will the black be, and the more capable of uniting with all other colours, without suppressing them, and even without making them tawny.

Dr Lewis acquaints us, that by mixing different blue, red, and yellow colours, he has not been able to produce a perfect black; but has often obtained from them very dark colours, such as may be called *brown-blacks*, or *grey-blacks*; such as we commonly see in the dark parts of paintings, and such as the charcoal and foot blacks appear when diluted a little. The ingre-

dients being each of a dark deep colour is a very necessary condition; for bright blues, bright reds, and bright yellows, mixed in such proportions that neither colour prevailed, produced only a grey. In effect, all compositions of this kind, physically considered, can be no other than greys, or some of the intermediate tints between whiteness and darkness; and these greys will be so much the lighter or darker as the component colours of themselves are bright or dark.

With regard to the extraction of the colouring matter from the different kinds of vegetables commonly to be met with of all colours, this would certainly be a very valuable acquisition, could the colours so procured be made durable. On this subject nothing hath yet appeared more satisfactory than what is delivered by Dr Lewis in his notes on Neumann's chemistry. His observations are curious, but promise very little success to any who shall attempt to fix these vegetable colours.

“Among the infinite variety of colours (says he), which glow in the flowers of plants, there are very few which have any durability, or whose fugitive beauty can be arrested by art, so as to be applied to any valuable purposes. The only permanent ones are the yellow, the red, the blue; and all the intermediate shades of purple, crimson, violet, &c. are extremely perishable. Many of these flowers lose their colours on being barely dried; especially if they are dried slowly, as has been usually directed, in a shady, and not warm place. The colours of all of them perish on keeping even in the closest vessels. The more hastily they are dried, and the more perfectly they are secured from the air, the longer they retain their beauty. The colouring matter extracted and applied on other bodies is still more perishable: oftentimes it is changed or destroyed in the hands of the operator.”

“The colour of many blue flowers is extracted by infusion in water; but there are some from which water gains only reddish, or purplish blue. Of those that have been tried there is not one which gives any blue tincture to spirituous liquors: some give no colour at all, and some a reddish one. The juice pressed out from the fresh flowers is for the most part blue. The blue juices and infusions are changed red by all acids. The marine acid seems to strike the most florid red. The flowers themselves, macerated in acid liquors, impart also a deep red tincture. Alkalies, both fixed and volatile, and lime-water, change them to a green. Those infusions of the juices which have nothing of the native colour of the flowers, suffer the same changes from the addition of acid and alkaline liquors: even when the flowers have been kept till their colour is lost, infusions made from them acquire still a red colour from the one, and a green from the other, though in a less degree than when the flowers were fresh. The red colour produced by acids is scarcely more durable than the original blue: applied upon other bodies and exposed to the air, it gradually degenerates into a faintish purple, and at length disappears, leaving hardly any stain behind. The green produced by alkalies changes to a yellow, which does not fade so soon. The green, by lime-water, is more permanent and more beautiful: green lakes, prepared from these flowers by lime-water, have been used as pigments by the

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Dr Lewis's
experi-
ments on
vegetable
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the painter. The flowers of cyanus have been greatly recommended, as affording elegant and durable blue pigments; but I have never been able to extract from them any blue colour at all. They retain their colour indeed, when hastily dried, longer than some other blue flowers: but they communicate nothing of it to any kind of menstruum. Infusions of them in watery, spirituous, and oily liquors, are all of them more or less of a reddish cast, without any tendency to blue. Alum, which is said to heighten and preserve their blue colour, changes it, like that of other blue flowers, to a purplish red; acids to a deep red; alkalies and lime-water to a green; solution of tin added to the watery infusion, turns it of a fine crimson; on standing, a beautiful red *fæcula* subsides, but it loses all its colour by the time it is dry. The watery infusion, inspissated to the consistence of an extract, appears of a dark reddish brown: an extract made with rectified spirit is of a purplish colour. The colour of both extracts spread thin, and exposed to the air quickly fades. The flowers employed in these experiments were those of the common blue-bottle of the corn-fields.

“Red flowers readily communicate their own red colour to watery menstrua: among those that have been tried, there is not one exception. Those of a full red colour give to rectified spirit also a deep red tincture, brighter, though somewhat paler, than the watery infusion: but the lighter red flowers, and those which have a tendency to purplish, impart very little colour to spirit, and seem to partake more of the nature of the blue flowers than of the pure red. Infusions of red flowers are supposed to be heightened by acids, and turned green by alkalies, like those of the blue; but this is far from being universal. Among those I have examined, the rose-colours and purplish reds were changed nearly in the same manner as the blues; but the full deep reds were not. The deep infusion of red poppies is changed by alkalies, not to a green, but to a dusky purple.

“The colours of yellow flowers, whether pale or deep, are in general durable. Many of them are as much so, perhaps, as any of the native colours of vegetables. The colour is extracted both by water and by spirit. The watery infusions are the deepest. Neither alkalies nor acids alter the species of the colour, though both of them vary its shade; acids rendering it paler, and alkalies deeper: alum likewise considerably heightens it, though not so much as alkalies. An infusion of the flowers, made in alkaline ley, precipitated by alum, gives a durable yellow lake. In some of the deep reddish yellow, or orange coloured flowers, the yellow matter seems to be of the same kind with that of the pure yellow flowers, but the red to be of a different kind from the pure red ones; watery menstrua take up only the yellow, and leave the red, which may afterwards be extracted by rectified spirit of wine, or by water acuated by fixed alkaline salt. Such particularly are the saffron-coloured flowers of *carthamus*. These, after the yellow matter has been extracted by water, are said to give a red tincture to ley; from which, on standing at rest for some time, a deep bright red *fæcula* subsides; called from one of the names of the plant which produces it, *safflower*; and from the countries whence it is commonly brought to

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us, *Spanish-red*, and *Chinaslake*. This pigment impregnates spirit of wine with a beautiful red tincture, but communicates no colour to water. I have endeavoured to separate, by the same treatment, the red matter of some of the other reddish yellow flowers, as those of garden marigold, but without success. Plain water extracted a yellow colour, and alkaline ley extracted afterwards only a paler yellow: though the digestions were continued till the flowers had lost their colour, the tinctures were no other than yellow, and not so deep as those obtained from the pure yellow flowers. The little yellow *flosculi*, which in some kind of flowers are collected into a compact round disc, as in the daisy and corn-marigold, agree, so far as they have been examined, with the expanded yellow petals. Their colour is affected in the same manner by acids, by alkalies, and by alum; and equally extracted by water and by spirit. But the yellow farina, or fine dust, lodged on the tips of the stamina of flowers, appears to be of a different kind. It gives a fine bright yellow to spirit, and a duller yellow to water; the undissolved part proving in both cases of a pale yellowish white. Both the watery and spirituous tinctures were heightened by alkaline liquors, turned red by acids, and again to a deep yellow on adding more of the alkali: I know no other vegetable yellow that is turned red by acids.

“White flowers are by no means destitute of colouring matter. Alkaline lixivium extract from some of them a green tincture, and change their colourless expressed juices to the same colour; but I have not observed that they are turned red by acids. The flowers of the common wild convolvulus or bind-weed, which in all their parts are white, give a deep yellow or orange tincture to plain water; which, like the tinctures of flowers that are naturally of that colour, is rendered paler by acids, heightened a little by alum, and more considerably by alkaline salts. The vapours of the volatile vitriolic acid, or of burning sulphur, which whiten or destroy the colour of the coloured flowers, make no change in the white.

“The red juices of fruits, as currants, mulberries, elder-berries, morello, and black cherries, &c. gently inspissated to dryness, dissolve again almost totally in water, and appear nearly of the same red colour as at first. Rectified spirit extracts the tinging particles, leaving a considerable portion of mucilaginous matter undissolved; and hence the spirituous tincture proves of a brighter colour than the watery. The red solutions, and the juices themselves, are sometimes made dull, and sometimes more florid, by acids, and generally turned purplish by alkalies. The colours of these juices are for the most part perishable. They resist, indeed, the power of fermentation, and continue almost unchanged, after the liquor has been converted into wine; but when the juice is spread thin upon other bodies, exsiccated, and exposed to the air, the colour quickly alters and decays: the bright lively red changes the soonest: the dark dull red stain from the juice of the black cherry, is of considerable durability. The fruit of the American *opuntia* or prickly pear, the plant upon which the cochineal insect is produced, is perhaps an exception: This bright red fruit, according to Labat, gives a beautiful red dye. Some experiments, however, made upon the juice of that fruit,

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fruit, as brought into England, did not promise to be of any great advantage: but the particulars I cannot now recollect.

"The ripe berries of buckthorn stain paper of a green colour. From these is prepared the substance called *sap-green*, a pigment sufficiently durable, readily soluble in water, but not miscible with oil. The berries dried while green, and macerated in alum-water, are said to yield a yellow pigment; and when they have grown over ripe so as to fall off spontaneously, a purple one. It is said that the berry of the *heliotropium tricoceum*, which grows wild about Montpellier, stains paper of a green colour, and that this green turns presently to a blue: that the common blue paper receives its colour from this juice: and that the red rags called *turnsol*, employed for colouring wines and other liquors, are tintured by the same juice turned red by acids. According to M. Nissolle of the French academy of sciences (as quoted by Savary in his *Dictionnaire de Commerce*), the colouring juice is obtained not from the berries, but from tops of the plant gathered in August, ground in mills, and then committed to the press. The juice is exposed to the sun about an hour, the rags dipt in it, dried in the sun, moistened by the vapour which arises during the flaking of quicklime with urine, then dried again in the sun, and dipped again in the juice. The Dutch and others are said to prepare *turnsol* rags, and *turnsol* in the mass, from different ingredients, among which archil is a principal one.

See An-
notte.

"In some plants, peony for instance, the seeds at a certain point of maturity are covered with a fine shining red membrane. The pellicles of the seeds of a certain American tree afford the red masses brought into Europe under the names of *annotto*, *orlean*, and *raucou* †. Mr Pott, in the Berlin Memoirs for the year 1752, mentions a very extraordinary property of this concrete. 'With the vitriolic acid it produces a blue colour, of extreme beauty; but with this capital defect, that all salts and liquors, and even common water, destroy it.' The specimen of *annotto*, which I examined, was not sensibly acted upon by spirit of vitriol; it received no change in its own colour, and communicated none to the liquor. Nor did any visible change ensue upon dropping the acid into tinctures of *annotto* made in water, or in spirit.

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Colours
from
leaves.

"The green colour of the leaves of plants is extracted by rectified spirit of wine and by oils. The spirituous tinctures are generally of a fine deep green, even when the leaves themselves are dull-coloured, or yellowish, or hoary. The colour, however, seldom abides long even in the liquor; much less when the tinging matter is separated in a solid form, and exposed with a large surface to the air. The editor of the *Wirtemberg Pharmacopœia* observes, that the leaves of *acanthus*, *brankursine*, or bear's-breach, give a more durable green tincture to spirit than those of any other herb. Alkalies heighten the colour both of the tinctures and green juices; acids weaken, destroy, or change it to a brownish: lime-water improves both the colour and durability: by means of lime, not elegant green lakes are procurable from the leaves of *acanthus*, lily of the valley, and several other plants. There are very few herbs which communicate any share of their green colour to water; perhaps none

that give a green of any considerable deepness. It is said, however, that the leaves of some plants give a green dye to woollen, without the addition of any other colouring matter; particularly those of the wild chervil, or cow-weed, the common ragwort, and devil's bit. The leaves of many kinds of herbs and trees give a yellow dye to wool or woollen cloth that has been previously boiled with a solution of alum and tartar. Weld, in particular, affords a fine yellow, and is commonly made use of for this purpose by the dyers, and cultivated in large quantity in some parts of England. There is no colour for which we have such plenty of materials as for yellow. Mr Hellot observes, that all leaves, barks, and roots, which on being chewed discover a slight astringency, as the leaves of the almond, peach, and pear-trees, ash-bark (especially that taken off after the first rising of the sap in the spring), the roots of wild patience, &c. yield durable yellows, more or less beautiful according to the length of time that the boiling is continued, and the proportions of alum and tartar in the preparatory liquor: that a large quantity of alum makes these yellows approach to the elegant yellow of weld: that if the tartar is made to prevail, it inclines then to an orange; that if the roots, barks, or leaves, be too long boiled, the yellow proves tarnished, and acquires shades of brown." See the article DYEING.

The most capital preparations from the leaves of plants, are those of indigo and weld; which are both very much used in dyeing, though the first only in painting ‡. Both the indigo and woad plants give out their colour, by proper management, to water, in form of a blue fecula or lake. Mr Hellot suspects that a like blue fecula is procurable from many other vegetables. Blue and yellow blended together, compose a green. He supposes the natural greens in vegetables to be compounded in like manner of these two colours; and that the blue is oftentimes the most permanent, so as to remain entire after the putrefaction or destruction of the yellow. The theory is specious, and perhaps just: we know of no other that accounts in any degree for the production of the indigo and woad blue. Dr Lewis, however, informs us, that he never was able to produce the least appearance of either blue or yellow from any of the plants he tried by treating them in the manner used for the preparation of indigo.

There are fundry mosses, which in their natural state, like the indigo and woad plants, promise nothing of the elegant colours that can be extracted from them by art. The most remarkable of these is archil; for the preparation of which, and the colours that may be produced from it, see the article. Linnæus suspects that there are several other more common mosses from which valuable colours might be extracted: a quantity of sea-moss having rotted in heaps on the shore, he observed the liquor in the heaps to be as red as blood; the sea-water, the sun, and the putrefaction, having brought out the colour. Mr Kalm, in an appendix to Linnæus's paper, in 1745, mentions two sorts of mosses actually employed in Sweden for dyeing woollen red: one is the *Lichenoides coralliforme apicibus coccineis* of Ray's Synopsis; the other the *Lichenoides tartareum*, *farinaceum*, *scutellarum*.

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Production
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mosses.

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larum umbone fusco, of Dillenius. This last is a white substance like meal clotted together, found on the sides and tops of hills. It is shaved off from the rocks after rain, purified from the stony matters intermixed among it by washing with water, then dried in the sun, ground in mills, and again washed and dried: it is then put into a vessel with urine, and set by for a month: a little of this tincture added to boiling water makes the dyeing colour. In the same Transactions for the year 1754, there is an account of another moss which, prepared with urine, gives a beautiful and durable red or violet dye to wool and silk. This is the lichen foliaceus umbilicatus subtus lacunensis, Linn. flor. Suec. It grows upon rocks, and is readily distinguishable from others of that class, by looking as if burnt or parched, consisting of leaves as thin as paper, convex all over on the upper side, with corresponding cavities underneath, adhering firmly to the stones by a little root under the leaves, and coming asunder, when dry, as soon as touched. It is gathered after rain, as it then holds best together, and parts easiest from the stone. In France, a crustaceous moss, growing upon rocks in Auvergne, is prepared with lime and urine, and employed by the dyers as a succedaneum for the Canary archil, to which it is said to be very little inferior. Mr Hellot relates, that he has met with several other mosses, which, on being prepared in the same manner, acquire the same colour. The most expeditious way, he says, of trying whether a moss will yield an archil or not, is to moisten a little of it with a mixture of equal parts of spirit of sal ammoniac and strong lime-water, and add a small proportion of crude sal ammoniac. The glass is then to be tied over with a piece of bladder, and set by for three or four days. If the moss is of the proper kind, the little liquor which runs from it upon inclining the vessel, will appear of a deep crimson colour; and this afterwards evaporating, the plant itself acquires the same colour. Dr Lewis informs us, that he has tried a good number of the common mosses, many both of the crustaceous and foliaceus kind, and not a few of the fungi; as also the herbs chamomile and milfoil, which yield a blue essential oil; and thyme, whose oil becomes blue by digestion with volatile spirits; but never met with any that yielded a colour like archil. Most of them gave a yellow or reddish brown tincture. A few gave a deep red colour to the liquor: but, when diluted, it showed a yellowish cast, and when applied on cloth it gave only a yellowish red.

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Some blue flowers may probably yield permanent colours.

To these observations we shall only add, that though, in general, the blue colours of flowers are exceedingly perishable, there seem to be at least two exceptions to this rule; for the blue flowers of iris, or flower-de-luce, and those of columbine, when treated with solution of tin, yielded a colour tolerably permanent. Indeed, when experiments are made with a view to extract the colour from any part of a vegetable, it will always be proper to try whether it can bear a mixture with this solution. If the colour is not destroyed by it, there is a very great probability that the solution will, by proper management, preserve, and give a durability to it, which could scarce be obtained by any other method. It must, however, be observed, that there are several substances used in colour-

making, which solution of tin cannot bear to be mixed with. These are principally sugar of lead and cream of tartar, as well as all the calcareous earths and alkaline salts. With alum it may be mixed very safely, and is in many cases the better for it. The roots of plants, however, seem to promise more durability of colour than the upper parts. We have seen a blue colour of considerable durability and brightness prepared from the roots of common radishes by expressing the juice, combining it with tobacco-pipe clay, and brightening it with a little alum. The root of the red beet is also said to yield a durable colour of a beautiful red, inclining to scarlet; but this we cannot affirm from our own experience.

Colour-making
||
Colt.41
Colours from roots.

With regard to liquid colours for maps, &c. we apprehend there can be very little difficulty of preparing all the possible varieties of them, if what we have above laid down is attended to. The only colour with which there can be any difficulty is blue; but the common solutions of indigo in alkalies or acids may be made to answer this purpose, though, on account of their strongly saline quality, they are not very proper. A very curious method of procuring a beautiful transparent blue colour is by extracting the colouring matter from Prussian blue, by means of a caustic alkali. This when laid upon paper appears of a dirty brown colour; but if washed over with a weak solution of green vitriol, is instantly changed to a most beautiful blue. This seems to afford a method of procuring blue transparent colours of greater beauty than they are usually met with.—See specimens of transparent colours prepared according to the above rules, on the Chart subjoined to HISTORY.

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Colours for maps.

COLOURING, among painters, the manner of applying and conducting the colour of a picture; or the mixtures of light and shadows, formed by the various colours employed in painting. See PAINTING.

COLOURING of Glass. See GLASS.

COLOURING of Porcelain. See PORCELAIN.

COLT, in zoology, a general name for the young of the horse-kind; the male being likewise, for distinction's sake, called a *horse-colt*; the female, a *filly*.

After the colts have been foaled, you may suffer them to run with the mare till about Michaelmas, sooner or later, according as the cold weather comes in; then they must be weaned; though some persons are for having them weaned after Martinmas, or the middle of November. The author of the *Complete Horseman* is of opinion, that the reason why most foals advance so slowly, and are not capable of service till they are six or seven years old, is because they have not sucked long enough; whereas, if they had sucked the whole winter over, they would be as good at four or five years old as they are now at eight.

Sportsman's Dictionary.

They ought now to be kept in a convenient house, with a low rack and manger for their hay and oats, which must be sweet and good; with a little wheaten bran mixed with the oats to cause them to drink, and to keep their bodies open. But, since there are some who allege that oats make foals become blind, or their teeth crooked; the same author is of opinion, that oats will wear their teeth, and make them the sooner to change, and also to raze; therefore he judges it to be the best way to break them in a mill, because that by endeavouring with their jaws to bruise

Colt.

and chew them, they stretch and swell their eye and nether-jaw veins, which so attract the blood and humours that they fall down upon the eyes, and frequently occasion the loss of them: so that it is not the heating quality of the oats, but the difficulty in chewing, that is the cause of their blindness.

Further, colts thus fed with grain do not grow thickish upon their legs, but grow broader and better knit than if they had eaten nothing but hay and bran, and will endure fatigue the better. But above all, they must be kept from wet and cold, which are hurtful to them, nothing being more tender than they are. For proof of this, take a Spanish stallion, and let him cover two mares, which for age, beauty, and comeliness, may admit of no difference between them; and if they produce both horse-colts, or both fillies, which is one and the same thing, let one run abroad, and the other be housed every winter, kept warm, and ordinarily attended; and that colt that has been kept abroad shall have large fleshy shoulders, flabby and gouty legs, weak pasterns, and ill hoofs; and shall be a dull heavy jade, in comparison to the other which is housed and orderly kept; and which will have a fine forehead, be fine shaped, and have good legs and hoofs, and be of good strength and spirit: by which you may know, that to have the finest stallion, and the beautifullest mare, is nothing if they are spoiled in the breeding up. It is worth observation, that some foals, under six months old, though their dams yield plenty of milk, yet decay daily, and have a cough, proceeding from certain pellicles or skins that breed in their stomachs, which obstruct their breathing, and at last destroy them entirely. To remedy this malady, take the bag wherein the colt was foaled, dry it, and give him as much of it in milk as you can take up with three fingers: but if you have not preserved the bag, procure the lungs of a young fox, and use it instead of the aforesaid powder.

It will be proper to let the colts play an hour or two in some court-yard, &c. when it is fair weather, provided you put them up again carefully, and see that they take no harm. When the winter is spent, turn them into some dry ground, where the grass is short and sweet, and where there is good water, that they may drink at pleasure: for it is not necessary that a colt should fill his belly immediately, like a horse that labours hard. The next winter you may take them into the house, and use them just as you do your other horses; but let not your horse-colts and fillies be kept together after the first year. This method may be observed every summer and winter till you break them, which you may do after they have been three years old; and it will be a very easy thing, if you observe the aforesaid method of housing them: for ordering them the second year as you do your other horses, they will be so tame and gentle, that you need not fear their leaping, plunging, kicking, or the like; for they will take the saddle quietly. As for all those ridiculous methods of beating and cowing them, they are in effect spoiling them, whatever they call it, in ploughed fields, deep ways, or the like; instead of which, let the rider strive to win them by gentle usage, never correcting them but when it is necessary, and then with judgment and moderation. You will not need a cavesson of cord, which is a head

strain, nor a pad of straw; but only a common saddle, and a common cavesson on his nose, such as other horses are ridden with; but it ought to be well lined with double leather; and if you please you may put on his mouth a watering-bit, but without reins, only the head-stall, and this but for a few days; and then put on such a bit as he should be always ridden with; and be sure not to use spurs for some time after backing. Take notice, that as yearlings must be kept abroad together, so those of two years old together; the like for those of three yearlings: which ordering is most agreeable to them.

In order to make him endure the saddle the better, the way to make it familiar to him will be by clapping the saddle with your hand as it stands upon his back, by striking it, and swaying upon it, dangling the stirrups by his sides, rubbing them against his sides, and making much of them, and bringing him to be familiar with all things about him; as straining the crupper, fastening and loosening the girths, and taking up and letting out the stirrups. Then as to the motion of him, when he will trot with the saddle obediently, you may wash a trench of a full mouth, and put the same into his mouth, throwing the reins over the forepart of the saddle, so that he may have a full feeling of it; then put on a martingale, buckled at such a length that he may but just feel it when he jerks up his head; then take a broad piece of leather, and put it about his neck, and make the ends of it fast by plaiting of it, or some other way, at the withers, and the middle part before his weasand, about two handfuls below the thropple, betwixt the leather and his neck; let the martingale pass so, that when at any time he offers to duck, or throw down his head, the cavesson being placed upon the tender gristle of his nose, may correct and punish him; which will make him bring his head to, and form him to an absolute rein: trot him abroad; and if you find the reins or martingale grow slack, straiten them, for when there is no feeling there is no virtue.

Colt-Evil, among farriers. See FARRIERY, § xxxviii. 4.

Colt-Taming, is the breaking of a colt so as to endure a rider. Colts are most easily broke at three or four years of age; but he who will have patience to see his horse at full five, will have him much more free of diseases and infirmities than if he was broke sooner.

Preparatory to their breaking for the saddle, they should be used to familiar actions, as rubbing, clawing, haltering, leading to water, taking up their feet, knocking their hoofs, &c. In order to bridle and saddle a colt, when he is made a little gentle, take a sweet watering trench, washed and anointed with honey and salt, which put into his mouth, and so place it that it may hang about his tush; then offer him the saddle, but take care not to fright him with it. Suffer him to smell at it, to be rubbed with it, and then to feel it; after that, fix it and gird it fast; and make that motion the most familiar to him to which he seems most averse. Being thus saddled and bridled, lead him out to water and bring him in again: when he has stood reined upon the trench an hour or more, take off the bridle and saddle, and let him go to his meat till the evening, and then lead him out as before:

Colt.

Coltie.
Coluber.

fore : and when you carry him in again to set him up, take off his saddle gently, clothing him for all the night.

COLTIE, a term used by timber-merchants for a defect or blemish in some of the annular circles of a tree, whereby its value is much diminished.

COLUBER, in zoology, a genus of serpents belonging to the order of amphibia. The characters are these : they have a number of scuta or hard crusts on the belly ; and scutellæ or scales on the tail. Linnaeus enumerates no less than 97 species under this name, distinguished solely by the number of scuta and scutellæ. The most remarkable are the following.

1. The Vipera, or common viper of the shops, has 118 scuta, and only 22 scutellæ. The body is very short, and of a pale colour, with brownish spots ; and the head is gibbous, and covered with small scales. It is a native of Egypt, and other warm countries. It has always been remarkable for its poisonous nature ; inasmuch that vipers, when numerous, have often been thought the ministers of divine vengeance, like the plague, famine, and other national calamities. A notion also prevailed among the ancients, that few or none of the parts of a viper were free from poison ; for which reason they made no experiments or discoveries concerning the nature of these creatures. It is now, however, proved, by undoubted experiments, that the poison of vipers, as well as of all other serpents whose bite is hurtful, lies in a bag at the bottom of their two greater teeth or fangs. These teeth are perforated ; and when the creature bites, the compression of the bag forces out a little drop of the poison into the wound, where it produces its mischievous effects. The purpose answered by this poisonous liquor to the creatures themselves, is probably the destruction of their prey ; for as serpents frequently feed upon animals of very considerable magnitude and strength, they would often undoubtedly make their escape, did not the poisonous juice instilled into the wounds made by the serpents teeth almost instantly deprive them of life, or at least of all power to struggle with their enemy. For an account of the symptoms produced by the bites of vipers and other venomous serpents in the human body, together with the best methods of cure, see the *Index* subjoined to *MEDICINE*. After the viper is deprived of those bags which contain its poison, it is entirely harmless : nay the flesh of it is highly nutritive, and justly esteemed a great restorative. It hath been much recommended in scrophulous, leprous, and other obstinate chronical disorders ; but, to answer any good purpose, it must undoubtedly be used for a considerable time as food. The dried flesh which comes to this country from abroad, is justly esteemed by Dr. Lewis to be totally insignificant. A volatile salt was formerly drawn from vipers, and sold at a great price, as a sovereign remedy against the bites of vipers and other poisonous animals ; but it is now found not to be materially different from the volatile alkaline salts procured by distilling other animal substances.

2. The berus, or common British viper, is found in many countries of Europe. They swarm in the He-

brides, or western British isles, and abound in many parts of Britain ; particularly in the dry, stony, and chalky counties. According to Mr Pennant and other naturalists, they are viviparous, but proceed from an internal egg. The eggs are, as it were, chained together ; and each about the size of the egg of a black-bird. This viper seldom grows longer than two feet ; though Mr Pennant tells us he once saw a female (which is nearly a third larger than the male) almost three feet long. The ground colour of the male is of a dirty yellow, that of the female deeper. Its back is marked the whole length with a series of rhomboidal black spots, touching each other at the points ; the sides with triangular ones ; the belly entirely black. It hath 146 scuta, and 39 scutellæ. There is a variety wholly black ; but the rhomboid marks are very conspicuous even in this, being of a deeper and more glossy hue than the rest. The head of the viper, says Mr Pennant, is inflated, which distinguishes it from the common snake. Mr Catesby assures us, that the difference between the vipers and snakes or other serpents is, that the former have long hollow fangs, or tusks, with an opening near the point ; the neck is small, the head broad, the cheeks extending wide, scales rough, the body for the most part flat and thick ; they are slow of motion ; swell the head and neck when irritated, and have a terrible and ugly aspect." Another material difference, however, consists in the production of their young : the viper hatches its eggs within itself, and then discharges the young ; whereas the snake deposits its eggs, which are therefore externally hatched. The tongue is forked, the teeth small ; the four canine teeth are placed two on each side the upper jaw : these instruments of poison are long, crooked, and moveable ; capable, like those of the former species, of being raised or depressed at the pleasure of the animal, and they instil their poison in the same manner. The vipers are said not to arrive at their full growth till they are six or seven years old ; but they are capable of engendering at two or three. They copulate in May, and go about three months with their young. Mr White informs us†, that a viper which he opened had in it 15 young ones of the size of earth-worms, about 7 inches long. This little fry issued into the world with the true viper-spirit about them. They twisted and wriggled about with great alertness ; and when touched, they erected themselves, and gaped very wide, showing immediate tokens of menace and defiance, tho' no fangs could be perceived even with the help of glasses : which the author remarks as an instance among others of that wonderful instinct which impresses young animals with a notion of the situation and use of their natural weapons even before these weapons are formed. Mr Pennant tells us, that he has been assured of a fact mentioned by Sir Thomas Brown*, who was far from being a credulous writer (A), that the young of the viper, when terrified, will run down the throat of the parent, and seek for shelter in its belly, in the same manner as the young of the opossum retire into the ventral pouch of the old one. From this some have imagined that the viper is so unnatural as to devour its

Coluber.

† *Hist. of Selborne*, p. 210.

* *Vulgar Errors*, p. 114.

(A) The viper catchers, however, insist, that no such thing ever happens. See *White's Nat. Hist. of Selborne*, p. 51.

Coluber. its own young: but the assertion deserves no credit; it being well known that the food of these serpents is frogs, toads, lizards, mice, and, according to Dr Mead, even an animal so large as a mole, which they are able to swallow entire, their throat and neck being capable of great distension. It is also said, from good authority, that vipers prey on young birds; but whether on such as nestle on the ground, or whether they climb up trees for them, as the Indian serpents do, is quite uncertain; the fact, however, is very far from being recent; For Horace tells us,

Ut assidens implumibus pullis avis

Serpentium allapsis timet.

EPOD. I.

Thus for its young the anxious bird

The gliding serpent fears.

The viper is capable of supporting very long abstinence; it being known, that some have been kept in a box six months without food, and yet did not abate of their vivacity. They feed only a small part of the year, but never during their confinement; for if mice, their favourite diet, should at that time be thrown into their box, though they will kill, yet they never will eat them. The violence of their poison decreases in proportion to the length of their confinement, as does also the virtue of their flesh whatever it is. The animals, when at liberty, remain torpid throughout the winter; but, when confined, have never been observed to take their annual repose. The method of catching them is by putting a cleft stick on or near their head; after which they are seized by the tail, and instantly put into a bag. The viper-catchers are very frequently bit by them in the pursuit of their business, yet we very rarely hear of their bite being fatal. Salad oil, if applied in time, is said to be a certain remedy. The flesh of the British viper has been celebrated as a restorative, as well as that of the foreign kind. Mr Keyser relates, that Sir Kenelm Digby used to feed his wife, who was a most beautiful woman, with capons fattened with the flesh of vipers.

3. The punctatus of Linnæus, by Mr Catesby called the *water-viper*, is a native of Carolina. According to Linnæus it is ash-coloured, variegated with yellow spots. Mr Catesby informs us, that the head and back of this serpent are brown, the belly marked transversely with yellow, and also the sides of the neck. The neck is small, the head large, and the mouth armed with the destructive fangs of the viper or rattle-snake, next to which it is reckoned the largest serpent in this country. Contrary to what is observed in most other vipers, these are very nimble and active, and very dexterous in catching fish. In summer, great numbers are seen lying on the branches of trees hanging over rivers; from which, on the approach of a boat, they drop into the water, and often into the boat on the mens heads. They lie in wait in this manner to surprise either birds or fish: after the latter they plunge with surprising swiftness, and catch some of a large size, which they bring ashore and swallow whole. The tail of this animal is small towards the end, and terminates in a blunt horny point about half an inch long. This harmless little horn hath been the occasion of many terrible reports; as, that by a jerk of its tail, the animal is capable of instantly destroying both men and beast; that a

tree struck with this terrible horn, in a short time grows black, withers, and dies, &c. but all these Mr Catesby assures us have not the least foundation in fact.

4. The cherssea is a native of Sweden, where it is called *asping*. It is a small reddish serpent, whose bite is said to be mortal. Concerning this species Mr Pennant asks, "is it possible that this could be the species which has hitherto escaped the notice of our naturalists? I the rather suspect it, as I have been informed that there is a small snake that lurks in the low grounds of Galloway, which bites and often proves fatal to the inhabitants."

5. The prester of Linnæus, or black viper of Mr Catesby, is a native of Carolina and Virginia. It is short and thick, slow of motion, spreads its head surprisingly when irritated, very flat and thick, threatening with a horrid hiss. They are very poisonous; their bite being as deadly as that of the rattlesnake. They frequent the higher lands, and are of a rusty black colour.

6. The coluber luridus of Forster, called by Mr Catesby the *brown viper*; is a native of the same countries with the preceding. It is about two feet long, and large in proportion; very slow in its motion, even when threatened with danger: notwithstanding which, it defends itself very fiercely when attacked, and its bite is as venomous as any. They prey upon efts, lizards, and other animals of that kind.

Besides these species of which we have a particular description, the following are also reckoned among the poisonous serpents, viz. 7. The atropos, with 131 scuta and 22 scutellæ. It is a native of America, the body white, and the eyes brown, with a white iris. 8. The leberis, with 110 scuta and 50 scutellæ, is a native of Canada, and has many black linear rings. 9. The ammodites, with 142 scuta and 32 scutellæ, is a native of the East. It is about six inches long, and has a fleshy protuberance on its nose. 10. The aspis, with 146 scuta and 46 scutellæ, is a native of France; and is of a reddish colour, with dusky spots on the back. 11. The lebetinus, with 155 scuta and 46 scutellæ, is a native of Asia, and is of a cloudy colour, with red spots on the belly. 12. The severus, with 170 scuta and 42 scutellæ, is likewise a native of Asia, and is ash-coloured with white belts. 13. The stollatus, with 143 scuta and 76 scutellæ, is a native of Asia, and is of a greyish colour, with two white fillets. 14. The lacteus, with 203 scuta and 32 scutellæ, is a native of the Indies. Its colour is white, with black spots. 15. The naja, with 193 scuta and 60 scutellæ, is a native of the East Indies, and is reckoned the most poisonous of all serpents. The root of the lignum colubrinum (*ophiorrhiza*) is said to have been pointed out to the Indians as an antidote against the bite of this serpent by the viverra ichneumon, a creature which fights with this serpent, and cures itself by eating of this plant when wounded. The Indians, when bit, instantly chew it, swallow the juice, and apply the masticated root to the puncture. It is killed by the ichneumon. 16. The atrox, with 196 scuta and 69 scutellæ, is a native of Asia. It is of a hoary colour, and the head is compressed and covered with small scales. 17. The niveus, with 209 scuta and 62 scutellæ, is a native of Africa. It is white, and without

Coluber. out any spots. 18. The corallinus, with 193 scuta and 82 scutellæ, is a native of Asia. It is greyish, with three brown fillets. 19. The dipfas, with 152 scuta and 135 scutellæ, is a native of America. It is of a bluish colour, with the margins of the scales white. 20. The mycterizans, with 192 scuta and 167 scutellæ, is a native of America. It is of a bluish-green colour, hath a stretched out triangular snout. Inhabits trees, and lives on insects.

The above 20 species are all the serpents of the genus of coluber that are reckoned poisonous. Of the rest we shall only mention the following, which are the most remarkable.

21. The erythrogaster of Forster, called by Mr Catesby the *copper-bellied snake*, is a native of Carolina, and grows sometimes near to the size of a rattlesnake. It is of a brown colour in all parts of its body, except the belly, which is of a red copper colour. They frequent water, and probably prey on fish; but they will also devour birds and such other animals as they are able to overcome. They are bold and active, frequently entering poultry-houses, devouring the fowls and sucking their eggs.

22. The constructor, or black snake, is a native of several parts of America. They are very long, sometimes measuring six feet, and are all over of a shining black. This species is not only perfectly harmless, but extremely useful in clearing the houses of rats, which it pursues with wonderful agility to the very roofs, and all parts of barns and outhouses, for which good services it is cherished by the generality of Americans. It is also said, that it will destroy the rattlesnake, by twisting round it, and whipping it to death. In the time of copulation it is extremely bold and fierce, and will attack mankind; but its bite has no more effect than a scratch with a pin. It is so swift that there is no escaping its pursuit. Many ridiculous fright have happened from this innocent reptile. As every one in America is full of the dread of the rattlesnake, they are apt to fly at the sight of any of the serpent kind. This pursues, soon overtakes, and by twisting round the legs of the fugitive, soon brings him to the ground: but he happily receives no hurt, but what may result from this fright: all the mischief this species does is to the housewives, for it will skim their milk-pans of the cream, and rob their hen-roosts of all the eggs.

23. The annulatus, or little brown bead-snake, is always small, and is seldom found above ground, but commonly dug up, and found twisting about the roots of shrubs and plants. All the back and other parts of the body have transverse spots of brown and white so disposed as to have some resemblance to a string of English beads; whence probably it takes its name. It is quite harmless, and is a native of Virginia and Carolina.

24. The flagellum, or coach-whip snake, is of a brown colour, very long, slender, and active. It runs swiftly, and is quite inoffensive; but the Indians imagine it is able to cut a man in two with a jerk of its tail.

25. The fulvus, or corn-snake, is beautifully marked with red and white, resembling a species of Indian corn, whence its name. It is harmless as to its bite, but frequently robs hen-roosts.

26. The æstivus, or green snake, is all over of a green colour. It inhabits Carolina; where it lives

among the branches of trees on flies and other insects. It is of a small size, and easily becomes tame and familiar, insomuch that some people will carry them in their bosom.

27. The fasciatus, or wampum snake, derives its name from its resemblance to the Indian wampum. It sometimes grows to the length of five feet; and, like other large snakes, is very voracious, but its bite is not venomous. The back is of a dark blue, the belly finely clouded with spots of a brighter blue; the head is small in proportion to the rest of the body. See further the article SERPENT.

COLUMB-KILL. See IONA.

COLUMBA, the PIGEON, in ornithology, a genus belonging to the order of passeræ. The characters of this genus are as follow: The bill is strait, and descends towards the point; the nostrils are oblong, and half covered with a soft tumid membrane; and the tongue is entire, *i. e.* not cloven. There are about 70 species all natives of different countries. The following are the most remarkable.

1. The œnas, or domestic pigeon, and all its beautiful varieties, derive their origin from one species, the stock-dove; the English name implying its being the stock or stem from whence the other domestic birds spring. The birds, as Varro observes, take their Latin name, *columba*, from their voice or cooing: and, had he known it, he might have added the British also; for *k'lommen*, *kylobman*, *kulm*, and *kolm*, signify the same bird. They were, and still are, to be found in most parts of our island in a state of nature; but probably the Romans first taught the Britons how to construct pigeon-houses, and make the birds domestic. The characters of the domestic pigeon are the following. It is of a deep bluish ash-colour; the breast dashed with a fine changeable green and purple; the sides of the neck with shining copper-colour; its wings marked with two black bars, one on the coverts of the wings, the other on the quill-feathers; the back white, and the tail barred near the end with black. They weigh 14 ounces. In the wild state it breeds in holes of rocks and hollows of trees; for which reason some people style it *columba cavernalis*, in opposition to the ring-dove, which makes its nest on the boughs of trees. Nature always preserves some agreement in the manners, characters, and colours of birds reclaiming from their wild state. This species of pigeon soon takes to build in artificial cavities, and from the temptation of a ready provision becomes easily domesticated. Multitudes of these wild birds are observed to migrate into the south of England; and while the beech-woods were suffered to cover large tracts of ground, they used to haunt them in myriads, reaching in strings a mile in length, as they went out in the morning to feed. They visit Britain the latest of any bird of passage, not appearing till November, and retiring in the spring. Mr Pennant imagines, that the summer haunts of these creatures are in Sweden, as Mr Eckmark makes their retreat thence coincide with their arrival in Britain. Numbers of them, however, breed on cliffs of the coast of Wales, and of the Hebrides. The varieties produced from the domestic are very numerous, and extremely elegant; they are distinguished by names expressive of their several properties, as *tumblers*, *carriers*,

Columb.
Kill,
Columba.

Columba. riers, jacobines, croppers, powters, runts, turbits, owls, nuns, &c. The most celebrated of these is the carrier, of which an account is already given under the article *CARRIER-Pigeon*. The nature of pigeons is to be gregarious; to lay only two eggs, and to breed many times in the year. So quick is their increase, that the author of the "Oeconomy of Nature" observes, that in the space of four years 14,760 pigeons may come from a single pair. They bill during their courtship: the male and female sit, and also feed their young by turns: they cast provision out of their *craw* into the young one's mouth; and drink, not by sipping, like other birds, but by continued draughts like quadrupeds, and have mournful or plaintive notes.

2. The *palumbus*, or ring-dove, is a native of Europe and Asia. It is the largest pigeon we have, and might be distinguished from all others by its size alone. Its weight is about 20 ounces; its length 18, the breadth 30 inches. The head, back, and coverts of the wings, are of a bluish ash-colour: the lower side of the neck and breast are of a purplish red, dashed with ash-colour: on the hind part of the neck is a semicircular line of white; above and beneath that, the feathers are glossy, and of changeable colours as opposed to the light. This species forms its nest of a few dry sticks in the boughs of trees. Attempts have been made to domesticate them by hatching their eggs under the common pigeon in dove-houses; but as soon as they could fly, they always took to their proper haunts. In the beginning of winter they assemble in great flocks, and leave off cooing, which they begin in March when they pair.

3. The *turtur*, or turtle-dove, is a native of India. The length is 12 inches and a half; its breadth 21; the weight four ounces. The irides are of a fine yellow, and the eye-lids encompassed with a beautiful crimson circle. The chin and forehead are whitish; the top of the head ash-coloured mixed with olive. On each side of the neck is a spot of black feathers prettily tipped with white: the back ash-coloured, bordered with olive-brown: the scapulars and coverts of a reddish brown spotted with black: the breast of a light purplish red, having the verge of each feather yellow: the belly white. The tail is three inches and a half long; the two middle feathers of a dusky brown; the others black, with white tips; the end and exterior side of the outmost feathers wholly white. In the breeding season these birds are found in Buckinghamshire, Gloucestershire, Shropshire, and the west of England. They are very shy and retired, breeding in thick woods, generally of oak: in autumn they migrate into other countries.

4. The *passerina*, or ground-dove of Carolina, is about the size of a lark. The bill is yellow, and black at the end; the iris red; the breast and whole front of a changeable purple, with dark purple spots; the large quill-feathers are of a ruddy purple; the legs and feet of a dirty yellow; but the whole bird has such a composition of colours in it, that a very particular description is impossible. They fly many of them together, and make short flights from place to place, generally lighting on the ground.

5. The *migratoria*, or pigeon of passage, is about the size of an English wood-pigeon; the bill black; iris red; the head of a dusky blue; the breast and

belly of a faint red; above the shoulder of the wing there is a patch of feathers shining like gold; the wing is coloured like the head, having some few spots of black (except that the larger feathers of it are dark brown), with some white on the exterior vanes; the tail is very long, and covered with a black feather, under which the rest are white; the legs and feet are red. They come in prodigious numbers from the north, to winter in Virginia and Carolina. In these countries they roost upon one another's backs in such quantities that they often break down the limbs of oaks which support them, and leave their dung some inches thick below the trees. In Virginia, Mr Catesby has seen them fly in such continued trains for three days successively, that they were not lost sight of for the least interval of time, but somewhere in the air they were seen continuing their flight southward. They breed in rocks by the sides of rivers and lakes far north of St Lawrence. They fly to the south only in hard winters, and are never known to return.

6. The *coronata*, or great crowned pigeon, a very large species, the size of a turkey. The bill is black, and two inches long; the irides are red; the head, neck, breast, belly, sides, thighs, and under tail coverts, cinereous blue; the head is crested; the back, rump, scapulars, and upper tail coverts, are of a deep ash-colour, with a mixture of purplish chestnut on the upper part of the back and scapulars; the wing-coverts are ash-coloured within, and purplish chestnut on the outside and tip; quills deep blackish ash-colour; tail the same, but of a light ash-colour at the tip; the legs are blackish. This species inhabits the Molucca isles and New Guinea, and has been brought to England alive. Buffon mentions five having been at once alive in France. In size it far exceeds any of the pigeon tribe; but its form and manners tell us that it can belong to no other. Indeed Brisson has placed it with the pheasants; and the *planches enluminées* have copied that name; but whoever has observed it cannot doubt in the least to which it belongs. Its note is cooing and plaintive, like that of other pigeons, only more loud in proportion. The mournful notes of these birds alarmed the crew of Bougainville much, when in the neighbourhood of them, thinking they were the cries of the human species. In France they were never observed to lay eggs, nor in Holland, though they were kept for some time; but Scopoli assures us, that the male approaches the female with the head bent into the breast, making a noise more like lowing than cooing; and that they not only made a nest on trees, in the menagery where they were kept, but laid eggs. The nest was composed of hay and stalks. The female never sat, but stood upon the eggs; and he supposed it was from this cause alone that there was no produce. They are said to be kept by some, in the East Indies, in their court-yards, as domestic poultry. The Dutch at the Moluccas call them *crown-vogel*. M. Sonnerat, as well as Dampier, found these in plenty at New Guinea; and it is probable that they were originally transported from that place into Banda, from whence the Dutch chiefly now procure them.

Among the great number of other species of *columba*, there are some very small, not larger than a wood-lark. The Malacca pigeon described by Sonnerat is little bigger than the house-sparrow. It is a most beautiful

Columba. beautiful species, and the flesh said to be extremely delicate. It has been transported into the isle of France, where it has multiplied exceedingly.

Pigeons, besides being esteemed as a delicacy for the table, are of value on other accounts. Their dung is thought to be so good amendment for some kinds of land, that it has been fetched 16 miles, and a load of coals has been given for a load of it: it is also used for tanning the upper-leathers of shoes, as well as applied as a cataplasm to this day. Indeed formerly salt-petre was collected from it. The greatest use of pigeons is at Ispahan in Persia, where there are recorded to be above 3000 pigeon-houses, and these kept by the Turks alone, as Christians are not allowed to keep any. Dr Pococke mentions the frequency of pigeon-houses in Egypt; adding, that the pigeon-house is reckoned a great part of the estate of the husbandman; and the common proverb in those parts is, that a man who has a pigeon-house need not be careful about the disposal of his daughter. Tavernier says that their dung is used to smoke melons. The usual way taken to entice pigeons to remain where they are intended, is to place what is called a *salt-cat* near them; this is composed of loam, old rubbish, and salt, and will so effectually answer the purpose as to decoy them from other places, and is therefore held illegal.

COLUMBA (St), in allusion to whose name the island of Iona (one of the Hebrides) received its name; *Iona* being derived from a Hebrew word signifying a dove. This holy man, instigated by his zeal, left his native country, Ireland, in the year 565, with the pious design of preaching the gospel to the Picts. It appears that he left his native soil with warm resentment, vowing never to make a settlement within sight of that hated island. He made his first trial at Oran-say; and finding that place too near to Ireland, succeeded to his wish at *Hy*, for that was the name of Iona at the time of his arrival. He repeated here the experiment on several hills, erecting on each a heap of stones; and that which he last ascended is to this day called *Carnan-chul-reh-Eirium*, or "The eminence of the back turned to Ireland."

Columba was soon distinguished by the sanctity of his manners: a miracle that he wrought so operated on the Pictish king Bradeus, that he immediately made a present of the little isle to the saint. It seems that his majesty had refused Columba an audience; and even proceeded so far as to order the palace-gates to be shut against him: but the saint, by the power of his word, instantly caused them to fly open. As soon as he was in possession of Iona, he founded a cell of monks, borrowing his institutions from a certain oriental monastic order. It is said that the first religious were canons regular, of whom the founder was the first abbot; and that his monks, till the year 716, differed from those of the church of Rome, both in the observation of Easter and in the clerical tonsure. Columba led here an exemplary life, and was highly respected for the sanctity of his manners for a considerable number of years. He is the first on record who had the faculty of *second sight*, for he told the victory of Aidan over the Picts and Saxons on the very instant it happened. He had the honour of burying in his island, Convallius and Kinnatil, two kings of Scotland, and of crowning a third. At length, worn out with age,

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he died in Iona in the arms of his disciples; was interred there, but (as the Irish pretend) in after times translated to Down; where, according to the epitaph, his remains were deposited with those of St Bridget and St Patrick.

*Hi tres in Duno tumulo tumulantur in uno;
Brigida, Patricius, atque Columba pius.*

But this is totally denied by the Scots; who affirm, that the contrary is shown in a life of the saint, extracted out of the pope's library, and translated out of the Latin into Erse, by Father *Cailo Horan*; which decides in favour of Iona the momentous dispute.

COLUMBANUS, a saint and a poet, was born in Ireland, and brought up to a religious life among the disciples of St Columba. He made uncommon progress in learning; and very early in life distinguished himself for poetical abilities, by the composition of a book of psalms, and a number of moral poems, intended also to be set to music. Jonas, a writer of ecclesiastical history, mentions, that Columbanus belonged originally to a monastery of the name of *Benchor*. The same monastery is mentioned by St Bernard in his life of his friend St Malachi; and he relates that it sent out a great number of monks, who spread over Europe. Columbanus passed from Britain into France, and founded the monastery of Luxeuville near Besançon. He had been kindly received and patronised by king Childebert; but he was afterwards expelled out of France by the wicked queen Brunichild. He retired to Lombardy in Italy, and was well received by king Argulphus. In Lombardy he again founded the monastery of Bobio. The *Regula Cœnobialis* and *Penitentialis*, which he established in that monastery, have been published in the *Codex Regularum* compiled by the learned Holstenius. He was cotemporary with St Benedict. It was in the year 589 he went into France.

COLUMBARIA (anc. geog.), an island like a rock on the west of Sicily, opposite to Drepanum; said by Zonaras to have been taken from the Carthaginians by Numerius Fabius the consul. Now *Columbara*, with a very strong and almost impregnable citadel (Cluverius).

COLUMBINE, in botany. See **AQUILEGIA**

COLUMBO-ROOT, an article lately introduced into the materia medica, the natural history of which is not yet well known. According to Dr Percival's account, it grew originally on the continent of America; from whence it was transplanted to Columbo, a town in Ceylon, which gives name to it, and supplies all India with it. The inhabitants of these countries have for a long time used it in disorders of the stomach and bowels. They carry it about with them, and take it sliced or scraped in Madeira wine. This root comes to us in circular pieces, which are from half an inch or an inch to three inches in diameter; and divided into *frusta*, which measure from two inches to one quarter of an inch. The sides are covered with a thick corrugated bark, of a dark brown hue on its external surface, but internally of a light yellow colour. The surfaces of the transverse sections appear very unequal, highest at the edges, and forming a concavity towards the centre. On separating this surface, the root is observed to consist of three lamina, viz. the cortical, which, in the larger roots, is a quarter of an inch thick;

Y

Columba-
nus
||
Columbo.

Columbo. thick; the ligneous, about half an inch; and the medullary, which forms the centre, and is near an inch in diameter. This last is much softer than the other parts, and when chewed, seems mucilaginous: a number of small fibres run longitudinally through it, and appear on the surface. The cortical and ligneous parts are divided by a black circular line. All the thicker pieces have small holes drilled through them, for the convenience of drying. Columbo-root has an aromatic smell; but is disagreeably bitter, and slightly pungent to the taste, somewhat resembling mustard-seed, when it has lost, by long keeping, part of its essential oil. Yet, though ungrateful to the taste, when received into the stomach, it appears to be corroborant, antiseptic, sedative, and powerfully antiemetic. In the cholera morbus it alleviates the violent *tormina*, checks the purging and vomiting, corrects the putrid tendency of the bile, quiets the inordinate motions of the bowels, and speedily recruits the exhausted strength of the patient. It was administered to a great number of patients, sometimes upwards of 20 in a day, afflicted with the cholera morbus, by Mr Johnson of Chester, in 1756. He generally found that it soon stopped the vomiting, which was the most fatal symptom, and that the purging and remaining complaints quickly yielded to the same remedy. The dose he gave was from half a drachm to two drachms of the powder, every three or four hours, more or less according to the urgency of the symptoms. Though this medicine possesses little or no astringency, it has been observed to be of great service in diarrhoeas, and even in the dysentery. In the first stage of these disorders, where astringents would be hurtful, Columbo-root may be prescribed with safety; as, by its antispasmodic powers, the irregular actions of the primæ viæ are corrected. But as a cordial, tonic, and antiseptic remedy, it answers better when given towards their decline. Its efficacy has also been observed in the vomitings which attend the bilious cholic; and in such cases, where an emetic is thought necessary, after administering a small dose of ipecacuan, the stomach may be washed with an infusion of Columbo-root. This will tend to prevent those violent and convulsive reachings which in irritable habits abounding with bile, are sometimes excited by the mildest emetic. In bilious fevers, 15 or 20 grains of this root, with an equal or double quantity of vitriolated tartar, given every four, five, or six hours, produce very beneficial effects. From its efficacy in these bilious diseases of this country, it is probable that it may be useful in the yellow fever of the West Indies, which is always attended with great sickness, violent reachings, and a copious discharge of bile. The vomiting recurs at short intervals, often becomes almost incessant, and an incredible quantity of bile is sometimes evacuated in a few hours. Children during dentition are often subject to severe vomitings and diarrhoeas. In these cases the Columbo-root is an useful remedy, and hath often procured almost instant relief, when other efficacious remedies have been tried in vain. This root is also extremely beneficial in a languid state of the stomach, attended with want of appetite, indigestion, nausea, and flatulence. It may be given either in substance, with some grateful aromatic, or infused in Madeira wine. Habitual vomiting, when it proceeds from a weakness

or irritability of the stomach, from an irregular gout, acidities, acrimonious bile, or an increased and depraved secretion of the pancreatic juice, is greatly relieved by the use of Columbo-root, in conjunction with aromatics, chalybeates, or the testaceous powders. In the nausea and vomiting occasioned by pregnancy, an infusion of Columbo-root succeeds better than any other medicine that hath been tried.

From Dr Percival's experiments on this root, it appears, that rectified spirit of wine extracts its virtues in the greatest perfection. The watery infusion is more perishable than that of other bitters. In 24 hours a copious precipitation takes place; and in two days it becomes ropy, and even musty. The addition of orange-peel renders the infusion of Columbo-root less ungrateful to the palate. An ounce of the powdered root, half an ounce of orange-peel, two ounces of French brandy, and 14 ounces of water, macerated 12 hours without heat, and then filtered through paper, afford a sufficiently strong and tolerably pleasant infusion. The extract made first by spirit and then with water, and reduced by evaporation to a pilular consistence, is found to be equal if not superior in efficacy to the powder. As an antiseptic, Columbo-root is inferior to the bark; but as a corrector of putrid gall, it is much superior to the bark; whence also it is probable that it would be of service in the West India yellow fever. It also restrains alimentary fermentation, without impairing digestion; in which property it resembles mustard. Hence its great service in preventing acidities. It hath also a remarkable power of neutralizing acids already formed. It doth not appear to have the least heating quality; and therefore may be used with propriety and advantage in the phthisis pulmonalis and in hectic cases, to correct acrimony and strengthen digestion. It occasions no disturbance, and agrees very well with a milk diet, as it abates flatulence, and is indisposed to acidity.

COLUMBO a maritime town of the island of Ceylon in the East Indies, seated on the south-west part of its coast, and subject to the Dutch. E. Long. 80. 10. N. Lat. 7. 5.

COLUMBUS, or *Congregation of St COLUMBUS*, a society of regular canons, who formerly had 100 abbeys or monasteries in the British isles.

COLUMBUS (Christopher), a Genoese, the celebrated navigator, and first discoverer of the islands of America, was a subject of the republic of Genoa. Neither the time nor the place of his birth, however, are known with certainty; only he was descended of an honourable family, who, by various misfortunes, had been reduced to indigence. His parents were sea-faring people; and Columbus having discovered, in his early youth, a capacity and inclination for that way of life, was encouraged by them to follow the same profession. He went to sea at the age of 14: his first voyages were to those ports in the Mediterranean frequented by the Genoese; after which he took a voyage to Iceland; and proceeding still further north, advanced several degrees within the polar circle. After this, Columbus entered into the service of a famous sea-captain of his own name and family. This man commanded a small squadron, fitted out at his own expence; and by cruising, sometimes against the Mahometans, and sometimes against the Venetians,

Columbo,
Columbus

Columbus, the rivals of his country in trade, had acquired both wealth and reputation. With him Columbus continued for several years, no less distinguished for his courage than his experience as a sailor. At length, in an obstinate engagement off the coast of Portugal, with some Venetian caravals returning richly laden from the Low Countries, the vessel on board which he served, took fire, together with one of the enemies ships to which it was fast grappled. Columbus threw himself into the sea; laid hold of a floating oar; and by the support of it, and his dexterity in swimming, he reached the shore, though above two leagues distant.

After this disaster, Columbus repaired to Lisbon, when he married a daughter of Bartholomew Perestrello, one of the captains employed by Prince Henry in his early navigations, and who had discovered and planted the islands of Porto Santo and Madeira. Having got possession of the journals and charts of this experienced navigator, Columbus was seized with an irresistible desire of visiting unknown countries. In order to indulge it, he made a voyage to Madeira, and continued during several years to trade with that island, the Canaries, Azores, the settlements in Guinea, and all the other places which the Portuguese had discovered on the continent of Africa.

By the experience acquired in such a number of voyages, Columbus now became one of the most skillful navigators in Europe. At this time, the great object of discovery was a passage by sea to the East Indies. This was attempted, and at last accomplished by the Portuguese, by doubling the Cape of Good Hope. The danger and tediousness of the passage, however, supposing it to be really accomplished, which as yet it was not, set Columbus on considering whether a shorter and more direct passage to these regions might not be found out; and, after long consideration, he became thoroughly convinced, that, by sailing across the Atlantic Ocean, directly towards the west, new countries, which probably formed a part of the vast continent of India, must infallibly be discovered. His reasons for this were, in the first place, a knowledge he had acquired of the true figure of the earth. The continents of Europe, Asia, and Africa, as far as then known, form but a small part of the globe. It was suitable to our ideas, concerning the wisdom and beneficence of the Author of nature, to believe, that the vast space, still unexplored, was not entirely covered by a waste and barren ocean, but occupied by countries fit for the habitation of man. It appeared likewise extremely probable, that the continent on this side the globe was balanced by a proportional quantity of land in the other hemisphere. These conjectures were confirmed by the observations of modern navigators. A Portuguese pilot having stretched farther to the west than was usual at that time, took up a piece of timber, artificially carved, floating upon the sea; and as it was driven towards him by a westerly wind, he concluded that it came from some unknown land situated in that quarter. Columbus's brother-in-law had found to the west of the Madeira isles a piece of timber fashioned in the same manner, and brought by the same wind; and had seen also canes of an enormous size floating upon the waves, which resembled those described by Ptolemy, as productions peculiar to the East Indies. After a course

of westerly winds, trees torn up by the roots were often driven upon the coast of the Azores; and at one time the dead bodies of two men, with singular features, which resembled neither the inhabitants of Europe nor Africa, were cast ashore there. The most cogent reason, however, was a mistaken notion of the ancient geographers concerning the immense extent of the continent of India. Though hardly any of them had penetrated beyond the river Ganges, some Greek writers had ventured to describe the provinces beyond that river, which they represented as regions of an immense extent. Ctesias affirmed that India was as large as all the rest of Asia. Onesicritus, whom Pliny the naturalist follows, contended that it was equal to a third part of the habitable earth. Nearchus asserted that it would take four months to march from one extremity of it to the other in a straight line. The journal of Marco Polo, who travelled into Asia in the 13th century, and who had proceeded towards the east far beyond the limits to which any European had ever advanced, seemed also so much to confirm these accounts, that Columbus was persuaded, that the distance from the most westerly part of Europe to the most easterly part of Asia was not very considerable; and that the shortest, as well as most direct course to the remote regions of the east, was to be found by sailing due west.

In 1474, Columbus communicated his ideas on this subject to one Paul a physician in Florence, a man eminent for his knowledge in cosmography. He approved of the plan, suggested several facts in confirmation of it, and warmly encouraged Columbus to persevere in an undertaking so laudable, and which must redound so much to the honour of his country and the benefit of Europe. Columbus, fully satisfied of the truth of his system, was impatient to set out on a voyage of discovery. The first step towards this was to secure the patronage of some of the considerable powers of Europe capable of undertaking such an enterprise. He applied first to the republic of Genoa; but his countrymen, strangers to his abilities, inconsiderately rejected his proposal as the dream of a chimerical projector, and thus lost for ever the opportunity of restoring their commonwealth to its ancient lustre. His next application was to the court of Portugal, where king John II. listened to him in the most gracious manner, and referred the consideration of his plan to Diego Ortiz, bishop of Ceuta, and two Jewish physicians, eminent cosmographers, whom he was accustomed to consult in matters of this kind. Unhappily these were the persons who had been the chief directors of the Portuguese navigations, and had advised to search for a passage to India by steering a course directly opposite to that which Columbus had recommended as shorter and more certain. They could not therefore approve of his proposal, without submitting to the double mortification of condemning their own theory, and of acknowledging his superiority. The result of their conferences was, that they advised the king to fit out a vessel privately, in order to attempt the proposed discovery, by following exactly the course which Columbus seemed to point out. John, forgetting on this occasion the sentiments of a monarch, meanly adopted this perfidious counsel. But the pilot chosen to execute Columbus's plan had neither the ge-

Columbus. *nus* nor fortitude of its author. Contrary winds arose; no sign of approaching land appeared; his courage failed; and he returned to Lisbon, execrating the project as equally extravagant and dangerous.

On discovering this dishonourable transaction, Columbus immediately quitted Portugal, and applied to the king of Spain; but lest he should be here again disappointed, he sent his brother Bartholomew into England, to whom he had fully communicated his ideas, in order that he might negotiate at the same time with Henry VII. who was reckoned one of the most sagacious as well as opulent princes of Europe. Bartholomew was very unfortunate in his voyage: he fell into the hands of pirates, who stripped him of every thing, and detained him a prisoner for several years. At last he made his escape, and arrived in London; but in such extreme indigence, that he was obliged to employ himself, during a considerable time, in drawing and selling maps, in order to pick up as much money as would purchase a decent dress in which he might venture to appear at court. The proposals were received by Henry with more approbation than by any monarch to whom they had hitherto been presented.

Columbus himself made his proposals to the king of Spain, not without many doubts of success, which soon appeared to be well founded. True science had as yet made so little progress in the kingdom of Spain, that most of those to whom the consideration of his plan was referred were utterly ignorant of the first principles on which he founded his hopes. Some, from mistaken notions concerning the dimensions of the globe, contended that a voyage to those remote regions of the East which Columbus expected to discover, could not be performed in less than three years. Others concluded, that either he would find the ocean of infinite extent, according to the opinion of some ancient philosophers; or that if he should persist in steering westwards beyond a certain point, the convex figure of the globe must infallibly prevent his return, and he must perish in the vain attempt to unite the two opposite hemispheres, which nature had for ever disjoined. Even without deigning to enter into any particular discussion, some rejected the scheme in general, upon the credit of a maxim made use of by the ignorant in all ages, "That it is presumptuous in any person to suppose that he alone possesses knowledge superior to all the rest of mankind united." By continual disappointments and delays, he was at last wearied out, and resolved to repair to the court of England in person, in hopes of meeting with a favourable reception there. He had already made preparations for this purpose, and taken measures for the disposal of his children during his absence, when Juan Perez, the prior of the monastery of Rabida near Palos, in which they had been educated, earnestly solicited him to defer his journey for a short time. Perez was a man of considerable learning, and some credit with Queen Isabella. To her therefore he applied; and the consequence of his application was a gracious invitation of Columbus back to court, accompanied with the present of a small sum to equip him for the journey. Ferdinand, however, still regarded the project as chimerical; and had the address to employ, in this new negotiation with

him, some of the persons who had formerly pronounced his scheme to be impracticable. To their astonishment, Columbus appeared before them with the same confident hopes of success as formerly, and insisted on the same high recompence. He proposed that a small fleet should be fitted out, under his command, to attempt the discovery; and demanded to be appointed perpetual and hereditary admiral and viceroy of all the seas and lands which he should discover; and to have the tenth of the profits arising from them settled irrevocably upon him and his descendants for ever. At the same time he offered to advance the eighth part of the sum necessary for accomplishing his design, on condition that he should be intitled to a proportional share in the adventure. If the enterprise should totally miscarry, he made no stipulation for any reward or emolument whatever. These demands were thought unreasonable; Isabella broke off the treaty she had begun, and Columbus was once more disappointed. He now resolved finally to leave Spain; and had actually proceeded some leagues on his journey, when he was overtaken by a messenger from Isabella, who had been prevailed upon by the arguments of Quintanilla and Santangel, two of Columbus's patrons, again to favour his undertakings. The negotiation now went forward with all manner of facility and dispatch; and a treaty with Columbus was signed on the 17th of April 1492. The chief articles of it were, that Columbus should be constituted high admiral in all the seas, islands, and continents he should discover, with the same powers and prerogatives that belonged to the high admiral of Castile within the limits of his jurisdiction. He was also appointed viceroy in all those countries to be discovered; and a tenth of the products accruing from their productions and commerce was granted to him for ever. All controversies or law-suits with respect to mercantile transactions were to be determined by the sole authority of Columbus, or of judges to be appointed by him. He was also permitted to advance one eighth part of the expence of the expedition, and of carrying on commerce with the new countries; and was intitled, in return, to an eighth part of the profit. But, though the name of Ferdinand was joined with Isabella in this transaction, his distrust of Columbus was still so violent, that he refused to take any part in the enterprise as king of Arragon; and as the whole expence of the expedition was to be defrayed by the crown of Castile, Isabella reserved for her subjects of that kingdom an exclusive right to all the benefits which might accrue from its success.

At last our adventurer set sail with three small ships, the whole expence of which did not exceed L. 4000. During his voyage he met with many difficulties from the mutinous and timid disposition of his men. He was the first who observed the variation of the compass, which threw the sailors into the utmost terror. For this phenomenon Columbus was obliged to invent a reason, which, though it did not satisfy himself, yet served to dispel their fears, or silence their murmurs. At last, however, the sailors lost all patience; and the admiral was obliged to promise solemnly, that in case land was not discovered in three days he should return to Europe. That very night, however, the island of San Salvador was discovered, which quickly

Columbus. put an end to all their fears. The sailors were then as extravagant in the praise of Columbus as they had before been insolent in reviling and threatening him. They threw themselves at his feet, implored his pardon, and pronounced him to be a person inspired by heaven with more than human sagacity and fortitude, in order to accomplish a design so far beyond the ideas and conception of all former ages. Having visited several of the West India islands, and settled a colony in Hispaniola†, he again set sail for Spain; and after escaping great dangers from violent tempests, arrived at the port of Palos on the 15th of March 1493.

† See Hispaniola.

As soon as Columbus's ship was discovered approaching, all the inhabitants of Palos ran eagerly to the shore, where they received the admiral with royal honours. The court was then at Barcelona, and Columbus took care immediately to acquaint the king and queen of his arrival. They were no less delighted than astonished with this unexpected event. They gave orders for conducting him into the city with all imaginable pomp. They received him clad in their royal robes, and seated on a throne under a magnificent canopy. When he approached, they stood up; and, raising him as he kneeled to kiss their hands, commanded him to take his seat upon a chair prepared for him, and to give a circumstantial account of his voyage. When he had finished his oration, which he delivered with much modesty and simplicity, the king and queen, kneeling down, offered up solemn thanks to God for the discovery. Every possible mark of honour that could be suggested by gratitude or admiration was conferred on Columbus; the former capitulation was confirmed, his family was ennobled, and a fleet was ordered to be equipped, to enable him to go in quest of those more opulent countries which he still confidently expected to find.

Notwithstanding all this respect, however, Columbus was no longer regarded than he was successful. The colonists he carried over with him were to the last degree unreasonable and unmanageable; so that he was obliged to use some severities with them; and complaints were made to the court of Spain against him for cruelty. On this, Francis de Bovadilla, a knight of Calatrava, was appointed to inquire into the conduct of Columbus; with orders, in case he found the charge of maladministration proved, to supersede him, and assume the office of governor of Hispaniola. The consequence of this was, that Columbus was sent to Spain in chains. From thence, however, he was freed immediately on his arrival, and had an opportunity granted him of vindicating his innocence. He was, however, deprived of all power; and notwithstanding his great services, and the solemnity of the agreement between him and Ferdinand, Columbus never could obtain the fulfilment of any part of that treaty. At last, disgusted with the ingratitude of a monarch whom he had served with such fidelity and success, and exhausted with fatigues, he ended his life on the 29th of May 1506.

COLUMBUS (Bartholemew), brother to Christopher, famous for his marine charts and spheres, which he presented to Henry VII. of England. He died in 1514.

COLUMBUS (Don Ferdinand), son of Christopher, and writer of his life. He entered into the ecclesiasti-

cal state; and founded a library, which he bequeathed to the church of Seville, to this day called the *Columbine library*. He died in 1560.

Columella
||
Column.

COLUMELLA, (Lucius Junius Moderatus), a Roman philosopher, was a native of Cadiz, and lived under the emperor Claudius about the year 42. He wrote a book on agriculture intitled *De Re rustica*, and another *De Arboribus*.

COLUMEY, a town of Red Russia in Poland, seated on the river Pruth, towards the confines of Moldavia, about 38 miles from Halicz, and 63 south of Leopold. This town has been very ill treated by the Cossacks, inasmuch that it is now inconsiderable, though there are several mines of salt in its district. E. Long. 16. 25. N. Lat. 48. 45.

COLUMN, in architecture, a round pillar made to support and adorn a building, and composed of a base, a shaft, and capital. See ARCHITECTURE, n° 33.

COLUMNS, denominated from their use.—Astronomical column is a kind of observatory, in form of a very high tower built hollow, and with a spiral ascent to an armillary sphere placed a-top for observing the motions of the heavenly bodies. Such is that of the Doric order erected at the Hotel de Soissons at Paris by Catharine de Medicis for the observations of Orontius Fineus, a celebrated astronomer of that time.

Chronological COLUMN, that which bears some historical inscription digested according to the order of time; as by lustres, olympiads, fasti, epochas, annals, &c. At Athens, there were columns of this kind, whereon were inscribed the whole history of Greece digested into Olympiads.

Funeral COLUMN, that which bears an urn, wherein are supposed to be inclosed the ashes of some deceased hero; and whose shaft is sometimes overspread with tears and flames, which are symbols of grief and of immortality.

Gnomonic COLUMN, a cylinder whereon the hour of the day is represented by the shadow of a stile. See DIAL.

Historical COLUMN, is that whose shaft is adorned with a basso-relievo, running in a spiral line its whole length; and containing the history of some great personage; such are the Trajan and Antonine columns at Rome.

Hollow COLUMN, that which has a spiral stair-case within for the convenience of ascending to the top; as the Trajan column, the stair-case whereof consists of 185 steps, and is illuminated by 43 little windows, each of which is divided by tambours of white marble. The monument, or fire-column, at London, has also a stair-case; but it does not reach to the top. These kinds of columns are also called *columnæ coelidæ* or *cochlidæ*.

Indicative COLUMN, that which serves to show the tides, &c. along the sea-coasts. Of this kind there is one at Grand Cairo of marble, whereon the overflowings of the Nile are expressed: by this they form a judgment of the succeeding season; when the water, for instance, ascends to 23 feet, it is a sign of great fertility in Egypt. See NILOMETER.

Instructive COLUMN, that raised, according to Josephus, lib. i. cap. 3. by the sons of Adam, whereon were engraven the principles of arts and sciences.

Bau-

Column.

Baudelot tells us, that the son of Pisistratus raised another of this kind, of stone, containing the rules and precepts of agriculture.

Itinerary COLUMN, a column with several faces, placed in the cross ways in large roads; serving to show the different routs by inscriptions thereon.

Lactary COLUMN, at Rome, according to Festus, was a column erected in the herb-market, now the place *Montanara*, which had a cavity in its pedestal, wherein young children abandoned by their parents, out of poverty or inhumanity, were exposed, to be brought up at the public expence.

Legal COLUMN. Among the Lacedemonians there were columns raised in public places, whereon were engraven the fundamental laws of the state.

Limitrophous or *Boundary COLUMN*, that which shows the limits of a kingdom or country conquered. Such was that which Pliny says Alexander the Great erected at the extremity of the Indies.

Manubary COLUMN, from the Latin *manubia*, "spoils of the enemy;" a column adorned with trophies built in imitation of trees, whereon the spoils of enemies were anciently hung. See *Trophy*.

Memorial COLUMN, that raised on occasion of any remarkable event; as the monument of London, built to perpetuate the memory of the burning of that city in 1666. It is of the Doric order, fluted, hollow, with a winding stair-case; and terminated a-top with waving flames. There is also another of the kind, in form of an obelisk, on the banks of the Rhine in the Palatinate, in memory of the famous passage of that river by the great Gustavus Adolphus and his army.

Menian COLUMN, any column which supports a balcony or meniana. The origin of this kind of column, Suetonius and Ascanius refer to one Menias; who having sold his house to Cato and Flaccus, consuls, to be converted into a public edifice, reserved to himself the right of raising a column withoutside, to bear a balcony, whence he might see the shews.

Milliary COLUMN, was a column of marble raised by order of Augustus in the middle of the Roman forum; from whence, as a centre, the distances of the several cities, &c. of the empire were reckoned, by other milliary columns disposed at equal distances on all the grand roads. This column was of white marble, the same with that which is now seen on the balustrade of the perron of the capital at Rome. Its proportion is massive, being a short cylinder, the symbol of the globe of the earth. It was called *milliarium aureum*, as having been gilt, at least the ball, by order of Augustus. It was restored by the emperors Vespasian and Adrian, as appears by the inscriptions.

Military COLUMN, among the Romans, a column whereon was engraven a list of the forces in the Roman army, ranged by legions, in their proper order; with design to preserve the memory of the number of soldiers, and of the order preserved in any military expedition. They had another kind of military column, which they called *columna bellica*, standing before the temple of Janus; at the foot whereof the consul declared war, by throwing a javelin towards the enemies countries.

Sepulchral COLUMN, anciently was a column erected on a tomb or sepulchre, with an inscription on its base.

Those over the tombs of persons of distinction were very large; those for the common people small: these last are called *stela* and *cippi*.

Statuary COLUMN, that which supports a statue. Such was that erected by Pope Paul V. on a pedestal before the church of St Maria at Rome; to support a statue of the Virgin, which is of gilt brass. This column was dug up in the temple of peace; its shaft is a single block of white marble 49½ feet high, and five feet eight inches diameter, of the Corinthian order.

The term *statuary column* may likewise be applied to Caryatides, persians, termini, and other human figures, which do the office of columns; and which Vitruvius calls *telomones* and *atlantes*. See *ARCHITECTURE*, n° 54.

Triumphal COLUMN, a column erected among the ancients in honour of an hero; the joints of the stones, or courses whereof, were covered with as many crowns as he had made different military expeditions. Each crown had its particular name, as *vallaris*, which was beset with spikes, in memory of having forced a palisade. *Muralis*, adorned with little turrets or battlements, for having mounted an assault. *Navalis*, of prows and beaks of vessels; for having overcome at sea. *Obsidionales*, or *graminales*, of grass; for having raised a siege. *Ovans*, of myrtle; which expressed an ovation, or little triumph; and *triumphalis*, of laurel, for a grand triumph. See *CROWN*.

COLUMNARIUM, in Roman antiquity, a heavy tribute, demanded for every pillar of a house. It was first laid on by Julius Cæsar, in order to put a stop to the extravagant expences laid out on sumptuous buildings.

COLUMNÆA, in botany: A genus of the angiospermia order, belonging to the didynamia class of plants; and in the natural method ranking under the 40th order, *Personata*. The calyx is quinquepartite; the upper lip of the corolla arched and entire; gibbous above the base; the antheræ convex; the capsule bilocular. There is but one species, a native of Martinico, of which we have no particular description.

COLUMNIFERI, in botany, an order of plants in the *fragmenta methodi naturalis* of Linnæus, in which are the following genera, viz. *bixa*, *corchorus*, *helio-carpus*, *kiggelaria*, *microcos*, *muntingia*, *thea*, *tilea*, *turnera*, *triumsetta*, *ayenia*, *grevia*, *helicteres*, *klein-hovia*, *adanfonia*, *alcea*, *althæa*, *bombax*, *camellia*, *gofypium*, *hermannia*, *hibiscus*, *lavatera*, *malope*, *malva*, *melochia*, *napæa*, *pentapetes*, *fida*, *stewartia*, *theobroma*, *urena*, *waltharia*.

COLURES, in astronomy and geography, two great circles supposed to intersect each other at right angles in the poles of the world, and to pass through the solstitial and equinoctial points of the ecliptic. See *GEOGRAPHY*.

COLURI, a little island in the gulph of Engia, in the Archipelago, formerly called *Salamis*. The principal town is of the same name, and seated on the south side, at the bottom of the harbour, which is one of the finest in the world. The famous Grecian hero, Ajax, who makes such a figure in Homer's *Iliad*, was king of this island. It is now, however, but a poor place; its commodities consist of wheat, barley, tar, rosin, pit-coal, sponges, and pot-ashes, which they carry to Athens.

Column

Coluri

Colutea Athens. It is seven miles south from Athens, and is separated from the continent by a strait about a mile over.

Colymbus.

COLUTEA, **BASTARD-SENA**, in botany: A genus of the decandria order, belonging to the diadelphia class of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The calyx is quinquefid; the legumen inflated, opening at the upper part of the base. There are three species, all of them deciduous flowering shrubs, adorned with many-lobed leaves, and butterfly-shaped flowers, of a deep yellow or red colour. They are propagated both by seeds and layers, and are hardy enough, though they sometimes require a little shelter when the weather is very cold.

COLYBA, or **COLYBUS**; a term in the Greek liturgy, signifying an offering of corn and boiled pulse, made in honour of the saints, and for the sake of the dead.

Balsamon, P. Goar, Leo, Allatius, and others, have written on the subject of *colyba*: the substance of what they have said is as follows: The Greeks boil a quantity of wheat, and lay it in little heaps on a plate; adding beaten peas, nuts cut small, and grape-stones, which they divide into several compartments, separated from each other by leaves of parsley. A little heap of wheat, thus seasoned, they call *κολυβα*. They have a particular formula for the benediction of the *colyba*: wherein, praying that the children of Babylon may be fed with pulse, and that they may be in better condition than other people, they desire God to bless those fruits, and those who eat them, because offered to his glory, to the honour of such a saint, and in memory of the faithful deceased. Balsamon refers the institution of this ceremony to St Athanasius; but the Greek Synaxary to the time of Julian the apostate.

COLYMBUS, in ornithology, a genus belonging to the order of anseres. The bill has no teeth, is subulated, straight, and sharp-pointed; the teeth are in the throat; the nostrils are linear, and at the base of the bill; and the legs are unfit for walking. This genus includes the divers, guillemots, and grèbes; of which the following are the most remarkable species.

1. The grylle, or black guillemot, is in length 14 inches, in breadth 22; the bill is an inch and an half long, straight, slender, and black; the inside of the mouth red; on each wing is a large bed of white, which in young birds is spotted: the tips of the lesser quill-feathers, and the coverts of the wings, are white: except those, the whole plumage is black. In winter it is said to change to white; and a variety spotted with black and white is not uncommon in Scotland. The tail consists of 12 feathers; the legs are red. These birds are found on the Bala isle in Scotland; in the island of St Kilda; and, as Mr Ray imagines, in the Farm Islands off the coast of Northumberland. It has also been seen on the rocks of Llandidno, in Caernarvonshire, in Wales. Except in breeding-time it keeps always at sea; and is very difficult to be shot, diving at the flash of the pan. The Welsh call this bird *cafean longur*, or "the sailor's hatred," from a notion that its appearance forebodes a storm. It visits St Kilda's in March; makes its nest far under ground; and lays a grey egg, or, as

Steller says, whitish and spotted with rust, and speckled with ash-colour.

2. The troile, or foolish guillemot, weighs 24 ounces: its length is 17 inches, the breadth 27½: the bill is three inches long, black, straight, and sharp-pointed; near the end of the lower mandible is a small process; the inside of the mouth yellow; the feathers on the upper part of the bill are short and soft like velvet; from the eye to the hind part of the head is a small division of the feathers. The head, neck, back, wings, and tail, are of a deep mouse-colour; the tips of the lesser quill-feathers white; the whole under part of the body is of a pure white; the sides under the wings marked with dusky lines. Immediately above the thighs are some long feathers that curl over them. The legs are dusky. They are found in amazing numbers on the high cliffs of several of the British coasts, and appear at the same time with the auk. They are very simple birds: for notwithstanding they are shot at, and see their companions killed by them, they will not quit the rock. Like the auk they lay only one egg, which is very large: some are of a fine pale blue; others white, spotted, or most elegantly streaked with lines crossing each other in all directions. They continue about the Orkneys the whole winter. The chief places they are known to breed in are the uninhabited isle of Priestholm, near the isle of Anglesey; on a rock called *Godreve*, not far from St Ives in Cornwall; the Farn isles, near the coast of Northumberland; and the cliffs about Scarborough in Yorkshire. They are also found in most of the northern parts of Europe, to Spitsbergen, the coast of Lapmark, and along the white and icy sea quite to Kamtschatka. Is frequently met with on the coasts of Italy in the winter. It is also known in Newfoundland, and in a few parts of the continent of North America, but has not hitherto been talked of as common. Our last voyagers met with it on the coast north of Nootka Sound. It is known by several names; by the Welch, *guillem*; at Northumberland and Durham, *guillemot* or *sea-hen*; in Yorkshire, *a scout*; by the Cornish, *kiddah*; in the southern parts, *willock*; and in Kamtschatka, *aru* or *kara*. The inhabitants of the last kill them in numbers for the sake of their flesh, though it is certainly very tough and ill tasted; but more especially for their skins, of which, as of other fowls, they make garments: the eggs are also accounted a great delicacy.

3. The septentrionalis, or red-throated diver, is more elegantly shaped than the others. It weighs three pounds. The length to the end of the tail is two feet; to the toes two feet four inches: the breadth three feet five inches. The head is small and taper, the bill straight; the head and chin are of a fine uniform grey; the hind part of the neck marked with dusky and white lines pointing downwards; the throat is of a dull red; the whole upper part of the body, tail, and wings, of a deep grey, almost dusky; but the coverts of the wings and the back are marked with a few white spots: the under side of the body is white; the legs dusky. This species breeds in the northern parts of Scotland, on the borders of the lakes. It is found also in Russia, Siberia, and Kamtschatka; but does not haunt the inland lakes. It is common in Iceland

Colymbus. land and Greenland, where it breeds in June, and lays two ash-coloured eggs, marked with a few black spots; it makes its nest in the grass on the shores, composed of moss and grass, and placed contiguous to the water. It swims and dives well, and flies admirably, and while flying is very noisy. It feeds on small fish, crabs, and sea insects. In the summer, it inhabits the rivers of Hudson's bay, appearing as soon as the rivers are open. Here it lays in June, and lines the nest with a little down from its own breast; the young fly before the end of August, and they all depart in September. They are called by the natives *asse-moqua*. They prey much on the fish entangled in the nets; but are often thereby caught themselves.

4. The arcticus, or black-throated diver, is somewhat larger than the last: the bill is black, and also the front; the hind part of the head and neck cinereous: the sides of the neck marked with black and white lines pointing downwards; the fore-part of a glossy variable black, purple, and green. The back, scapulars, and coverts of the wings, are black, marked, the two first with square, the last with round spots of white; the quill-feathers dusky; the breast and belly white; the tail short and black; legs partly dusky, and partly reddish. This species is now and then found in England, but is not common. It is sufficiently plenty in the northern parts of Europe, Norway, Sweden, and Denmark. Frequent in the inland lakes of Siberia, especially those of the arctic regions; in Iceland, Greenland, and the Ferroe Isles; and in America at Hudson's bay. It is supposed to cry and be very restless before rain, making a great noise: hence the Norwegians think it impious to destroy this species; but the Swedes, less superstitious, dress their skins, which, like all of this genus, are exceedingly tough, and use them for gun-cases and facings for winter caps.

5. The placialis, or northern diver, is three feet five inches in length; the breadth four feet eight; the bill to the corners of the mouth four inches long, black and strongly made. The head and neck are of a deep black; the hind part of the latter is marked with a large semilunar white band; immediately under the throat is another; both marked with black oblong strokes pointing down: the lower part of the neck is of a deep black, glossed with a rich purple; the whole under side of the body is white; the sides of the breast marked with black lines; the back, coverts of the wings, and scapulars, are black marked with white spots; those on the scapulars are very large, and of a square shape; two at the end of each feather. The tail is very short, and almost concealed by the coverts, which are dusky, spotted with white; the legs are black. This species inhabits several parts of the north of Europe, but is not very frequent on our shores; nor ever seen southward except in very severe winters. It is seldom met with on land, being for the most part on the open sea, where it is continually diving for fish, which it does with great agility, and flies high and well. It is common in Iceland and Greenland, where it breeds, and at that time frequents the fresh waters. It is sufficiently plentiful in Norway, and all along the arctic coasts, as far as the river Ob, in the Russian dominions. The Barabinsians, a nation situated between that river and the Irtysh, tan the breasts of this and other water-fowl; whose skins they prepare in such a manner as to pre-

serve the down upon them; and sewing a number of *Colymbus* them together, their husbands sell them, to make pellices, caps, &c. Garments made of these are very warm, never imbibing the least moisture; and are more lasting than could be imagined. It is also met with among the lakes of Hudson's bay. The natives of Greenland use the skins for cloathing; and the Indians about Hudson's bay adorn their heads with circlets of their feathers. At the last place it is known by the name of *athinue-moqua*. As they are seldom seen on the sea-coasts, but chiefly among the lakes, they are called by the Indians *inland loons*.

6. The immer, or ember-goose, is superior in size to a common goose. The head is dusky; the back, coverts of the wings, and tail, clouded with lighter and darker shades of the same. The primaries and tail are black; the under side of the neck spotted with dusky; the breast and belly silvery: the legs black. They inhabit the seas about the Orkney Islands; but in severe winters visit the southern parts of Great Britain. They are found also in Iceland, and most parts of northern Europe; likewise in Kamtschatka; but not in any parts of Siberia or Russia. It likewise inhabits Switzerland, particularly on the lake Constance, where it is known by the name of *fluder*. It is said to dive wonderfully well, and to rise at an amazing distance from the place where it plunged. The female makes its nest among the reeds and flags, and places it in the water; so that it is continually wet, as in some of the grebe genus. It is difficult to be taken, either on land or swimming on the water; but is not unfrequently caught under the water by a hook baited with a small fish, its usual food.

7. The Chinese diver, described by Mr Latham; the size uncertain, but in the drawing the length was 14 inches. The bill dusky: irides ash-colour: the upper parts of the head, neck, body, wings, and tail, dusky greenish brown; the middle of the feathers much darker: the fore part of the neck the same, but considerably paler: chin pale rufous: breast and under parts of the body pale rufous white, marked with dusky rufous spots: the quills and tail are plain brown, the last short: legs ash-colour. Supposed to inhabit China, as Mr Latham saw it among other well painted drawings at Sir Joseph Banks's; it was in the attitude of fishing, with a brass ring round the middle of the neck, in the manner of the figure, Plate CXXVI. From the various and uncertain accounts of authors, we are not clear what birds the Chinese use for catching fish; the custom, however, of doing it is manifest, from the relations of many travellers. The bird used for this purpose has a ring fastened round the middle of the neck, in order to prevent its swallowing; besides this it has a slender long string fastened to it; and, thus accoutred, is taken by its master into his fishing-boat, from the edge of which it is taught to plunge after the fish as they pass by; and as the ring prevents their passing further downwards, they are taken from the mouth of the bird as fast as they are caught. In this manner sometimes a great many are procured in the course of a few hours. When the keeper of the bird has taken sufficient for himself, the ring is taken off, and the poor slave suffered to satisfy its own hunger. We do not here give this bird as the one most commonly used for the above purpose; but have

Colymbus. have thought right to figure it as a species, if not new, at least as not generally known; and probably, from the circumstance of its situation in the painting, may prove one of the birds used on this occasion.

8. The *stellatus*, or speckled diver, a species less than the former, weighs two pounds and a half: and is 27 inches in length and three feet nine in breadth. The bill is three inches long, bending a trifle upwards; and is of a pale horn colour, the top of the upper mandible dusky; the head is dusky, dotted with grey; hind part of the neck plain dusky; the sides under the eye, the chin, and throat, white; fore part of the neck very pale ash-colour; back dusky, marked with oval spots of white; sides of the breast and body the same, but smaller; the spots on the rump and tail minute; breast and under parts white; quills dusky; legs brown; webs and claws pale. This bird is pretty frequent in England; sufficiently so on the river Thames, where it is called by the fishermen *sprat loon*, being often seen in vast numbers among the shoals of that fish, diving after them, and frequently approaching very near the boats while fishing. It is common about the Baltic and the White Sea, but not observed in other parts of Russia, yet is a native of Kamtschatka. It lays two eggs, in the grass, on the borders of lakes not far from the sea; they are exactly oval, the size of those of a goose, dusky, marked with a few black spots. These are also frequent about the fish-ponds in France, except they are frozen, when they betake themselves to the rivers. This and the two last visit New York in winter, but return very far north to breed.

9. The *crystatus*, crested diver, or cargoose, weighs two pounds and an half. Its length is 21 inches, the breadth 30; the bill is two inches and a quarter long, red at the base, and black at the point; between the bill and the eyes is a stripe of black naked skin; the irides are of a fine pale red; the tongue is a third part shorter than the bill, slender, hard at the end, and a little divided; on the head is a large dusky crest, separated in the middle. The cheeks and throat are surrounded with a long pendent ruff, of a bright tawney colour, edged with black; the chin is white; from the bill to the eye is a black line, and above that a white one; the hind part of the neck and the back are of a sooty hue; the rump, for it wants a tail, is covered with long soft down. The covert-feathers on the second and third joints of the wing, and the under coverts, are white; all the other wing-feathers, except the secondaries, are dusky, those being white; the breast and belly are of a most beautiful silvery white, glossy as satin; the outside of the legs and the bottom of the feet are dusky; the inside of the legs and the toes of a pale green. These birds frequent the meres of Shropshire and Cheshire, where they breed; and the great fen of Lincolnshire, where they are called *gaunts*. Their skins are made into tippets, and sold at as high a price as those which come from Geneva. This species lays four eggs of a white colour, and the same size with those of a pigeon. The nest is formed of the roots of bugbane, stalks of water-lily, pond weed, and water-violet, floating independent among the reeds and flags; the water penetrates it, and the bird sits and hatches the eggs in that wet condition; the nest is sometimes blown from among the flags into the middle of the water; in these circumstances the fable

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of the halcyon's nest may, in some measure, be vindicated. It is a careful nurse of its young; being observed to feed them most assiduously, commonly with small eels; and when the infant brood are tired, the parent will carry them either on its back or under its wings. It preys on fish, and is almost perpetually diving; it does not show much more than the head above water: and is very difficult to be shot, as it darts down on the least appearance of danger. It is never seen on land; and, though disturbed ever so often, will not fly farther than the end of the lake. Its skin is out of season about February, losing then its bright colour; and in the breeding time its breast is almost bare. The flesh is excessively rank.

10. The urinator, or tippet-grebe, thought by Mr Latham not to be a different species from the former, being only somewhat less, and wanting the crest and ruff. The sides of the neck are striped downwards from the head with narrow lines of black and white: in other respects the colours and marks agree with that bird. This species has been shot on Rostern Mere in Cheshire. It is rather scarce in England, but is common in the winter time on the lake of Geneva. They appear there in flocks of 10 or 12; and are killed for the sake of their beautiful skins. The under side of them being dressed with the feathers on, are made into muffs and tippets: each bird sells for about 14 shillings.

11. The *auritus*, eared grebe, or dob-chick, is in length one foot to the rump; the extent is 22 inches; the bill black, slender, and slightly recurved; the irides crimson; the head and neck are black; the throat spotted with white; the whole upper side of a blackish brown, except the ridge of the wing about the first joint, and the secondary feathers, which are white; the breast, belly, and inner coverts of the wings are white; the subaxillary feathers, and some on the side of the rump, ferruginous. Behind the eyes, on each side, is a tuft of long, loose, rust-coloured feathers hanging backwards; the legs are of a dusky green. They inhabit the fens near Spalding where they breed. No external difference is to be observed between the male and the female of this species. They make their nest not unlike that of the former; and lay four or five small eggs.

12. The horned grebe, is about the size of a teal; weight, one pound; length, one foot; breadth, 16 inches. Bill one inch, dusky; head very full of feathers, and of a glossy deep green, nearly black: thro' each eye is a streak of yellow feathers, elongated into a tuft as it passes to the hind head: the upper part of the neck and back is a dusky brown; the fore part of the neck and breast, dark orange red: the lesser wing coverts, cinerous; the greater and quills, black; middle ones, white; belly, glossy white; legs, cinerous blue before, pale behind.—It inhabits Hudson's bay; and first appears in May, about the fresh waters. It lays from two to four white eggs in June, among the aquatic plants; and is said to cover them when abroad. It retires south in autumn; appears then at New York, staying till spring, when it returns to the north. For its vast quickness in diving, it is called the *water-witch*. At Hudson's bay, it is known by the name of *seekoop*. See Plate CXLIII.

COM, a town of Asia in the empire of Persia, and province of Iracagemi. It is a large populous place,
Z but

Colymbus,
Com.

Coma but has suffered greatly by the civil wars. E. Long.
 49. 1. N. Lat. 34. 0.
COMA, or **COMA-VIGIL**, a preternatural propensity to sleep, when, nevertheless, the patient does not sleep, or if he does, awakes immediately without any relief. See *MEDICINE-Index*.

COMA Berenices, Berenice's hair, in astronomy, a modern constellation of the northern hemisphere, composed of unformed stars between the Lion's tail and Bootes. This constellation is said to have been formed by Conon, an astronomer, in order to console the queen of Ptolemy Evergetes for the loss of a lock of her hair, which was stolen out of the temple of Venus, where she had dedicated it on account of a victory obtained by her husband. The stars of this constellation, in Tycho's Catalogue, are 14; in Hevelius's, 21; and in the Britannic Catalogue, 43.

COMA Somnolentum, is when the patient continues in a profound sleep; and, when awakened, immediately relapses, without being able to keep open his eyes.

COMARUM, **MARSH-CINQUEFOIL**: A genus of the polygynia order, belonging to the icofandria class of plants; and in the natural method ranking under the 35th order, *Senticosæ*. The calyx is decemfid; the petals five, less than the calyx; the receptacle of the seeds ovate, spongy, and persisting. There is but one species, a native of Britain. It rises about two feet high, and bears fruit somewhat like that of the strawberry. It grows naturally in bogs, so is not easily preserved in gardens. The root dyes a dirty red. The Irish rub their milking pails with it, and it makes the milk appear thicker and richer. Goats eat the herb; cows and sheep are not fond of it; horses and swine refuse it.

COMB, an instrument to clean, untangle, and dress flax, wool, hair, &c.

Combs for wool are prohibited to be imported into England.

COMB is also the crest, or red fleshy tuft, growing upon a cock's head.

COMBAT, in a general sense, denotes an engagement, or a difference decided by arms. See *BATTLE*.

COMBAT, in our ancient law, was a formal trial of some doubtful cause or quarrel, by the swords or bastons of two champions. This form of proceeding was very frequent, not only in criminal but in civil causes; being built on a supposition that God would never grant the victory but to him who had the best right. The last trial of this kind in England was between Donald lord Ray appellant, and David Ramsay, Esq; defendant, when, after many formalities, the matter was referred to the king's pleasure. See the article *BATTLE*.

COMBER, or **CUMBER** (Thomas), an eminent divine born at Westram in Kent, in 1645, was educated at Cambridge; created doctor of divinity; and, after several preferments in the church, was made dean of Durham. He was chaplain to Anne princess of Denmark, and to king William and queen Mary. He was author of several works, viz. 1. A scholastical history of the primitive and general use of Liturgies. 2. A Companion to the Altar. 3. A brief discourse upon the offices of baptism, catechism, and confirmation. He died in 1699, aged 55.

COMBINATION, properly denotes an assemblage of several things, two by two.

COMBINATION, in mathematics, is the variation or alteration of any number of quantities, letters, or the like, in all the different manners possible. See *CHANGES*.

Aphorisms. I. In all combinations, if from an arithmetic decreasing series, whose first term is the number out of which the combinations are to be formed, and whose common difference is 1, there be taken as many terms as there are quantities to be combined, and these terms be multiplied into each other; and if from the series 1, 2, 3, 4, &c. there may be taken the same number of terms, and they be multiplied into each other, and the first product be divided by the second; the quotient will be the number of combinations required. Therefore, if you would know how many ways four quantities can be combined in seven, multiply the last four terms of the series, 7, 6, 5, 4, &c. together, and divide the product, which will be 840, by the product of the first four terms of the series, 1, 2, 3, 4, &c. which is 24, and the quotient 35 will be the combinations of 4 in 7. II. In all permutations, if the series 1, 2, 3, 4, &c. be continued to as many terms as there are quantities to be changed, and those terms be multiplied into each other; the product will be the number of permutations sought. Thus, if you would know how many permutations can be formed with five quantities, multiply the terms 1, 2, 3, 4, 5, together, and the product 120 will be the number of all the permutations.

Problems. I. To find the number of changes that may be rung on 12 bells. It appears by the second aphorism, that nothing is more necessary here than to multiply the numbers from 1 to 12 continually into each other, in the following manner, and the last product will be the number sought.

1
2
2
3
6
4
24
5
120
6
720
7
5040
8
40320
9
362880
10
3628800
11
39916800
12
479,001,600

II. Suppose the letters of the alphabet to be wrote so small that no one of them shall take up more space than the hundredth part of a square inch; to find how many square yards it would require to write all the permutations of the 24 letters in that size. By following the same method as in the last problem, the number of permutations of the 24 letters will be found

to

Combina-
tion.

to be 62,044,840,173,323,943,936,000. Now the inches in a square yard being 1296, that number multiplied by 100 gives 129,600, which is the number of letters each square yard will contain; therefore if we divide 62,044,840,173,323,943,936,000 by 129600, the quotient, which is 478,741,050,720,092,160, will be the number of the yards required, to contain the above mentioned number of permutations. But as all the 24 letters are contained in every permutation, it will require a space 24 times as large; that is, 11,489,785,217,282,211,840. Now the number of square yards contained on the surface of the whole earth is but 617,197,435,008,000, therefore it would require a surface 18620 times as large as that of the earth to write all the permutations of the 24 letters in the size above mentioned.

III. To find how many different ways the eldest hand at piquet may take in his five cards. The eldest hand having 12 cards dealt him, there remain 20 cards, any five of which may be in those he takes in; consequently we are here to find how many ways five cards may be taken out of 20. Therefore, by aphorism I. if we multiply 20, 19, 18, 17, 16, into each other, which will make 1860480, and that number be divided by 1, 2, 3, 4, 5, multiplied into each other, which make 120, the quotient, which is 15504, will be the number of ways five cards may be taken out of 20. From whence it follows, that it is 15503 to 1, that the eldest hand does not take in any five certain cards.

IV. To find the number of deals a person may play at the game of whist, without ever holding the same cards twice. The number of cards played with at whist being 52, and the number dealt to each person being 13, it follows, that by taking the same method as in the last experiment, that is, by multiplying 52 by 51, 50, &c. so on to 41, which will make 3,954,242,643,911,239,680,000, and then dividing that sum by 1, 2, 3, &c. to 13, which will make 6,227,020,800, the quotient, which is 635,013,559,600 will be the number of different ways 13 cards may be taken out of 52, and consequently the number sought.

Rank	1	2	3	4	5	6	7	8	9	10	11	12
A	1	2	3	4	5	6	7	8	9	10	11	12
B	1	1	1	1	1	1	1	1	1	1	1	1
C	1	1	1	1	1	1	1	1	1	1	1	1
D	1	1	1	1	1	1	1	1	1	1	1	1

The ARITHMETIC TRIANGLE;
or TABLE for COMBINATIONS.

Combina-
tion.

The construction of this table is very simple. The line A a consists of the first 12 numbers. The line A b consists every where of units; and second term 3, of the line B c, is composed of the two terms 1 and 2 in the preceding rank: the third term 6, in that line, is formed of the two terms 3 and 3 in the preceding rank: and so of the rest; every term, after the first, being composed of the two next terms in the preceding rank: and by the same method it may be continued to any number of ranks. To find by this table how often any number of things can be combined in another number, under 13, as suppose 5 cards out of 8; in the eighth rank look for the fifth term, which is 56, and that is the number required.

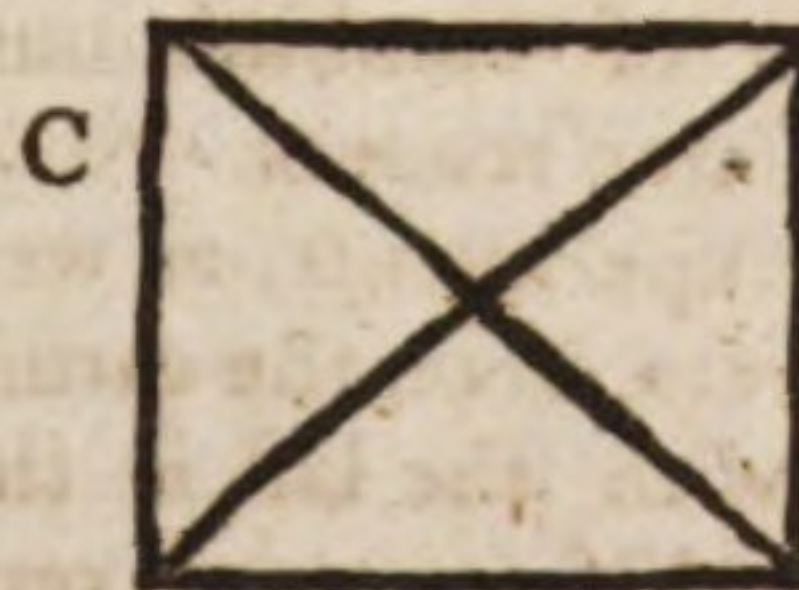
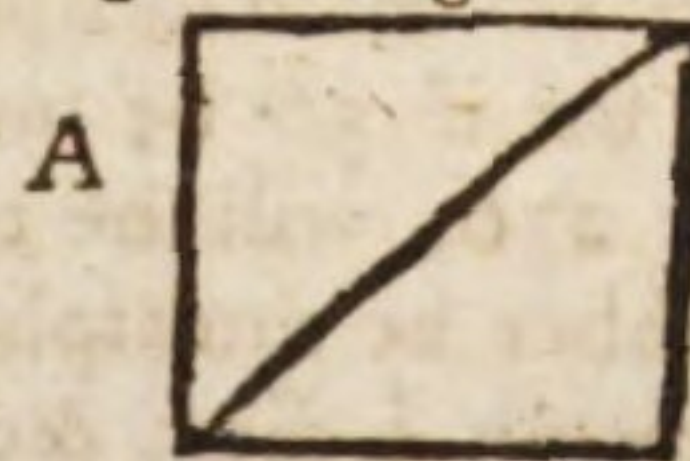
Though we have shown in the foregoing problems the manner of finding the combination of all numbers whatever, yet as this table answers the same purpose, for small numbers, by inspection only, it will be found useful on many occasions; as will appear by the following examples.

V. To find how many different sounds may be produced by striking on a harpsichord two or more of the seven natural notes at the same time. 1. The combinations of two in seven, by the foregoing triangle, are

2. The combinations of 3 in 7, are	21
3. The combinations of 4 in 7, are	35
4. The combinations of 5, are	35
5. The combinations of 6, are	21
6. The seven notes altogether once	7

Therefore the number of all the sounds will be 120

VI. Take four square pieces of pasteboard, of the same dimension, and divide them diagonally, that is by drawing a line from two opposite angles, as in the figures, into 8 triangles; paint 7 of these triangles with the primitive colours, red, orange, yellow, green, blue, indigo, violet, and let the eighth be white. To find how many chequers or regular four-sided figures, different either in form or colour, may be made out of those eight triangles. First, by combining two of these triangles, there may be formed either the triangular square A, or the inclined square B called a rhomb. Secondly, by combining four of the triangles, the large square C may be formed; or the long square D, called a parallelogram.



Now the first two squares, consisting of two parts out of 8, they may each of them, by the eighth rank of the triangle, be taken 28 different ways, which makes 56. And the last two squares, consisting of four parts, may each be taken by the same rank of the triangle 70 times, which makes 140. To which add the foregoing number 56. And the number of the different squares that may be formed of the 8 triangles, will be 196

Z 2

VII.

Combina-
tion.

VII. A man has 12 different sorts of flowers, and a large number of each sort. He is desirous of setting them in beds or flourishes in his parterre: Six flowers in some, 7 in others, and 8 in others; so as to have the greatest variety possible; the flowers in no two beds to be the same. To find how many beds he must have. 1. The combinations of 6 in 12, by the last rank of the triangle, are

2. The combinations of 7 in 12, are 924
3. The combinations of 8 in 12, are 792
Therefore the number of beds must be 495
2211

VIII. To find the number of chances that may be thrown on two dice. As each die has 6 faces, and as every face of one die may be combined with all the faces of the other, it follows, that 6 multiplied by 6, that is 36, will be the number of all the chances; as is also evident from the following table:

Points.	Numb. of chances.	Numb. of points.
2 1.1	1	2
3 2.1 1.2	2	6
4 2.2 3.1 1.3	3	12
5 4.1 1.4 3.2 2.3	4	20
6 3.3 5.1 1.5 4.2 2.4	5	30
7 6.1 1.6 5.2 2.5 4.3 3.4	6	42
8 4.4 6.2 2.6 5.3 3.5	5	40
9 6.3 3.6 5.4 4.5	4	36
10 5.5 6.4 4.6	3	30
11 6.5 5.6	2	22
12 6.6	1	12
	36	252

It appears by this table, 1. That the number of chances for each point continually increases to the point of seven, and then continually decreases till 12: therefore if two points are proposed to be thrown, the equality, or the advantage of one over the other, is clearly visible (A). 2. The whole number of chances on the dice being 252, if that number be divided by 36, the number of different throws on the dice, the quotient is 7: it follows therefore, that at every throw there is an equal chance of bringing seven points. 3. As there are 36 chances on the dice, and only 6 of them doublets, it is 5 to 1, at any one throw, against throwing a doublet.

By the same method the number of chances upon any number of dice may be found: for if 36 be multiplied by 6, that product, which is 216, will be the chances on 3 dice; and if that number be multiplied by 6, the product will be the chances on 4 dice, &c.

COMBINATIONS of the Cards. The following experiments, founded on the doctrine of combinations, may possibly amuse a number of our readers. The tables given are the basis of many experiments, as well on numbers, letters, and other subjects, as on the cards; but the effect produced by them with the last is the most surprising, as that which should seem to prevent any collusion, that is the shuffling of the cards, is on the contrary the cause from whence it proceeds.

It is a matter of indifference what numbers are made use of in forming these tables. We shall here confine ourselves to such as are applicable to the subsequent experiments. Any one may construct them in such manner as is agreeable to the purposes he intends they shall answer.

To make them, for example, correspond to the nine digits and a cipher, there must be ten cards, and at the top of nine of them must be written one of the digits, and on the tenth a cipher. These cards must be placed upon each other in the regular order, the number 1 being on the first, and the cipher at bottom. You then take the cards in your left hand, as is commonly done in shuffling, and taking off the two top cards, 1 and 2, you place the two following, 3 and 4, upon them; and under those four cards the three following, 5, 6, and 7: at the top you put the cards 8 and 9, and at the bottom the card marked 0; constantly placing in succession 2 at top and 3 at bottom: And they will then be in the following order:

8.9..3.4..1.2...5.6.7..0

If you shuffle them a second time, in the same manner, they will then stand in this order:

6.7..3.4..8.9..1.2.5..0

Thus at every new shuffle, they will have a different order, as is expressed in the following lines:

1 shuffle 8.9.3.4.1.2.5.6.7.0

2 6.7.3.4.8.9.1.2.5.0

3 2.5.3.4.6.7.8.9.1.0

4 9.1.3.4.2.5.6.7.8.0

5 7.8.3.4.9.1.2.5.6.0

6 5.6.3.4.7.8.9.1.2.0

7 1.2.3.4.5.6.7.8.9.0

It is a remarkable property of this number, that the cards return to the order in which they were first placed, after a number of shuffles, which added to the number of columns that never change the order, is equal to the number of cards. Thus the number of shuffles is 7, and the number of columns in which the cards marked 3, 4, &c. never change their places is 3, which are equal to 10, the number of the cards. This property is not common to all numbers; the cards sometimes returning to the first order in a less number, and sometimes in a greater number of shuffles than that of the cards.

TABLES of COMBINATIONS,

Constructed on the foregoing principles.

I. For ten numbers.

Order before dealing.	After 1st deal.	After the 2d.	After the 3d.
1	8	6	2
2	9	7	5
3	3	3	3
4	4	4	4
5	1	8	6
6	2	9	7
7	5	1	8
8	6	2	9
9	7	5	1
0	0	0	0

These

(A) It is easy from hence to determine whether a bett proposed at hazard, or any other game with the dice, be advantageous or not; if the dice be true (which, by the way, is rarely the case for any long time together, as it is so easy for those that are possessed of a dexterity of hand to change the true dice for false).

Combina-
tion.

These tables, and the following examples at piquet except the 36th, appear to have been composed by M. Guyot.

II. For twenty-four numbers.

Order before dealing. After 1st deal. After the 2d. After the 3d.

1	23	21	17
2	24	22	20
3	18	12	2
4	19	15	7
5	13	5	13
6	14	6	14
7	8	9	3
8	9	3	18
9	3	18	12
10	4	19	15
11	1	23	21
12	2	24	22
13	5	13	5
14	6	14	6
15	7	8	9
16	10	4	19
17	11	1	23
18	12	2	24
19	15	7	8
20	16	10	4
21	17	11	1
22	20	16	10
23	21	17	11
24	22	20	16

III. For twenty-seven numbers.

Order before dealing. After 1st deal. After the 2d. After the 3d.

1	23	21	17
2	24	22	20
3	18	12	2
4	19	15	7
5	13	5	13
6	14	6	14
7	8	9	3
8	9	3	18
9	3	18	12
10	4	19	16
11	1	23	21
12	2	24	22
13	5	13	5
14	6	14	6
15	7	8	9
16	10	4	19
17	11	1	23
18	12	2	24
19	15	7	8
20	16	10	4
21	17	11	1
22	20	16	10
23	21	17	11
24	22	20	16
25	25	25	25
26	26	26	26
27	27	27	27

IV. For thirty-two numbers.

Order before dealing. After 1st deal. After the 2d. After the 3d.

1	28	26	22
2	29	27	25
3	23	17	7
4	24	20	12
5	18	10	9
6	19	11	3
7	13	1	28
8	14	2	29
9	8	14	2
10	9	8	14
11	3	23	17
12	4	24	20
13	1	28	26
14	2	29	27
15	5	18	10
16	6	19	11
17	7	13	1
18	10	9	8
19	11	3	23
20	12	4	24
21	15	5	18
22	16	6	19
23	17	7	13
24	20	12	4
25	21	15	5
26	22	16	6
27	25	21	15
28	26	22	16
29	27	25	21
30	30	30	30
31	31	31	31
32	32	32	32

Combina-
tion.

I. "Several letters that contain no meaning, being written upon cards, to make them, after they have been twice shuffled, give an answer to a question that shall be proposed; as, for example, *What is love?*" Let 24 letters be written on as many cards, which, after they have been twice shuffled, shall give the following answer:

A dream of joy that soon is o'er.

First, write one of the letters in that line on each of the cards (B). Then write the answer on a paper, and assign one of the 24 first numbers to each card, in the following order:

A D R E A M O F J O Y T H A T S O O N

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

I S O ' E R.

20 21 22 23 24

Next, write on another paper a line of numbers, from 1 to 24, and looking in the table for 24 combinations, you will see that the first number after the second shuffle is 21; therefore the card that has the first letter of the answer, which is A, must be placed against that number, in the line of numbers you have just made (C). In like manner the number 22 being the second of the same column, indicates that the card which

(B) These letters should be written in capitals on one of the corners of each card, that the words may be easily legible when the cards are spread open.

(C) For the same reason, if you would have the answer after one shuffle, the cards must be placed according to the first column of the table; or if after three shuffles, according to the third column.

Combina-
tion. which answers to the second letter D of the answer,
much be placed against that number : and so of the rest.
The cards will then stand in the following order :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
O O F S A M N T O I S R H A E O ' E J O
20 21 22 23 24
R A D Y T

From whence it follows, that after these cards have been twice shuffled, they must infallibly stand in the order of the letters in the answer.

Observe 1. You should have several questions, with their answers, consisting of 24 letters, written on cards: these cards should be put in cases, and numbered, that you may know to which question each answer belongs. You then present the questions ; and when any one of them is chosen, you pull out the case that contains the answer, and showing that the letters written on them make no sense, you then shuffle them, and the answer becomes obvious.

2. To make this experiment the more extraordinary, you may have three cards, on each of which an answer is written ; one of which cards must be a little wider, and another a little longer, than the others. You give these three cards to any one, and when he has privately chosen one of them, he gives you the other two, which you put in your pocket without looking at them, having discovered by feeling which he has chosen. You then pull out the case that contains the cards that answer to his question, and perform as before.

3. You may also contrive to have a long card at the bottom, after the second shuffle. The cards may be then cut several times, till you perceive by the touch that the long card is at bottom, and then give the answer ; for the repeated cuttings, however often, will make no alteration in the order of the cards.

The second of these observations is applicable to some of the subsequent experiments, and the third may be practised in almost all experiments with the cards. You should take care to put up the cards as soon as the answer has been shown ; so that if any one should desire the experiment to be repeated, you may offer another question, and pull out those cards that contain the answer.

Though this experiment cannot fail of exciting at all times pleasure and surprise, yet it must be owned that a great part of the applause it receives arises from the address with which it is performed.

II. "The 24 letters of the alphabet being written upon so many cards, to shuffle them, and pronounce the letters shall then be in their natural order ; but that not succeeding, to shuffle them a second time, and then show them in proper order." Write the 24 letters on the cards in the following order :

1 2 3 4 5 6 7 8 9 10 11 12
R S H Q E F T P G U X C
13 14 15 16 17 18 19 20 21 22 23 24
N O D Y Z I K & A B L M

The cards being disposed in this manner, show them upon the table, that it may appear they are promiscuously marked. Then shuffle and lay them again on the table, pronouncing that they will be then in alphabetical order. Appear to be surprised that you have failed ; take them up again and give them a second shuffle, and then counting them down on the table they will all be in their natural order.

III. "Several letters being written promiscuously upon 32 cards, after they have been once shuffled, to find in a part of them a question ; and then shuffling the remainder a second time, to show the answer. Suppose the question to be, *What is each Briton's boast?* and the answer, *His liberty* ; which taken together contain 32 letters."

After you have written those letters on 32 cards, write on a paper the words, *his liberty*, and annex to the letters the first ten numbers thus ;

H I S L I B E R T Y.

1 2 3 4 5 6 7 8 9 10

Then have recourse to the table of combinations for ten numbers, and apply the respective numbers to them in the same manner as in experiment I. taking the first column, as these are to be shuffled only once, according to that order.

1 2 3 4 5 6 7 8 9 10
I B S L E R T H I Y

This is the order in which these cards must stand after the whole number 32 has been once shuffled, so that after a second shuffle they may stand in their proper order. Next dispose the whole number of letters according to the first column for 32 letters ; the last ten are to be here placed in the order above ; as follows.

W H A T I S E A C H B R I T O N ' S

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
B O A S T ?

18 19 20 21 22

I B S L E R T H I Y

23 24 25 26 27 28 29 30 31 32

Therefore, by the first column of the table, they will next stand thus :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
I T B R O N S C H B O A E A S T long card.
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
I I S B S L I B E R T W H H I Y

You must observe, that the card here placed the 16th in order, being the last of the question, is a long card ; that you may cut them, or have them cut, after the first shuffle, at that part, and by that means separate them from the other ten cards that contain the answer.

Your cards being thus disposed, you show that they make no meaning ; then shuffle them once, and cutting them at the long card, you give the first part to any one, who reads the question, but can find no answer in the others, which you open before him ; you then shuffle them a second time, and show the answer as above.

IV. "To write 32 letters on so many cards, then shuffle and deal them by twos to two persons, in such manner, that the cards of one shall contain a question, and those of the other an answer. Suppose the question to be, *Is nothing certain?* and the answer, *Yes, disappointment.*"

Over the letters of this question and answer, write the following numbers, which correspond to the order in which the cards are to be dealt by two and two.

I S N O T H I N G C E R T A I N ?

31 32 27 28 23 24 19 20 15 16 11 12 7 8 3 4
Y E S, D I S A P O I N T M E N T.

29 30 25 26 21 22 17 18 13 14 9 10 5 6 1 2

Then have recourse to the first column of the table for

Combina- for 32 numbers, and dispose these 32 cards in the fol-
tion. lowing order, by that column.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
O I E R G C A N T P I N T A I S
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
T M E H S D I N N O Y N T E I S

The cards being thus disposed, shuffle them once, and deal them two and two; when one of the parties will necessarily have the question, and the other the answer.

Instead of letters you may write words upon the 32 cards, 16 of which may contain a question, and the remainder the answer; or what other matter you please. If there be found difficulty in accommodating the words to the number of cards, there may be two or more letters or syllables written upon one card.

V. "The five beatitudes." The five blessings we will suppose to be, 1. Science, 2. Courage, 3. Health, 4. Riches, and 5. Virtue. These are to be found upon cards that you deal, one by one, to five persons. First write the letters of these words successively, in the order they stand, and then add the numbers here annexed to them.

S C I E N C E	C O U R A G E
31 26 21 16 11 6 1	32 27 22 17 12 7 2
H E A L T H	R I C H E S
28 23 18 13 8 3	29 24 19 14 9 4
V I R T U E	
30 25 20 15 10 5	

Then range them in order agreeable to the first column of the table for 32 numbers, as in the last experiment. Thus,

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
L H N A T E R E U A C R G T I U
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
E E C I I C H S O H R E E V S C

Next, take a pack of cards, and write on the four first the word Science; on the four next the word Courage; and so of the rest.

Matters being thus prepared, you show that the cards on which the letters are written convey no meaning. Then take the pack on which the words are written, and spreading open the first four cards, with their backs upwards, you desire the first person to choose one. Then close those cards and spread the next four to the second person; and so to all the five; telling them to hold up their cards lest you should have a confederate in the room.

You then shuffle the cards, and deal them one by one, in the common order, beginning with the person who chose the first card, and each one will find in his hand the same word as is written on his card. You will observe, that after the sixth round of dealing, there will be two cards left, which you give to the first and second persons, as their words contain a letter more than the others.

VI. "The cards of the game of piquet being mixed together, after shuffling them, to bring, by cutting them, all the cards of each suit together." The order in which the cards must be placed to produce the effect desired being established on the same principle as that explained in the experiment II. except that the shuf-

fling is here to be repeated three times, we think it will be sufficient to give the order in which they are to be placed before the first shuffle.

Order of the Cards.

1 Ace	clubs	17 King clubs
2 Knave		18 Ten
3 Eight	diamonds	19 Nine
4 Seven		20 Seven clubs
wide card		
5 Ten clubs		21 Ace diamonds
6 Eight	spades	22 Knave spades
7 Seven		23 Queen hearts
wide card		
8 Ten	diamonds	24 Knave hearts
9 Nine		25 Ace spades
10 Queen		26 King diamonds
11 Knave		27 Nine clubs
12 Queen clubs		28 Ace
13 Eight	hearts	29 King
14 Seven		30 Eight clubs
wide card		
15 Ten	spades	31 King
16 Nine		32 Queen

You then shuffle the cards, and cutting at the wide card, which will be the seven of hearts, you lay the eight cards that are cut, which will be the suit of hearts, down on the table. Then shuffling the remaining cards a second time, you cut at the second wide card, which will be the seventh of spades, and lay, in like manner, the eight spades down on the table. You shuffle the cards a third time, and offering them to any one to cut, he will naturally cut them at the wide card (D), which is the seven of diamonds, and consequently divide the remaining cards into two equal parts, one of which will be diamonds and the other clubs.

VII. "The cards at piquet being all mixed together, to divide the pack into two unequal parts, and name the number of points contained in each part." You are first to agree that each king, queen, and knave shall count, as usual, 10, the ace 1, and the other cards according to the number of the points. Then dispose the cards, by the table for 32 numbers, in the following order, and observe that the last card of the first division must be a wide card.

Order of the cards before shuffling.

1 Seven hearts	17 Nine diamonds	
2 Nine clubs	18 Ace spades	
3 Eight hearts	19 Ten clubs	
4 Eight	Knave	
5 Knave		diamonds
6 Ten	22 King	
7 Queen	clubs	23 Seven spades
8 Ace		24 Seven
9 Ace hearts	diamonds	25 Queen
wide card		
10 Nine hearts	26 Knave hearts	
11 Queen spades	27 King clubs	
12 Knave clubs	Nine	
13 Ten diamonds		spades
	29 King	

(D) You must take particular notice whether they be cut at the wide card; and if they are not, you must have them cut, or cut them again yourself.

Combina-
tion.14 Ten }
15 King } hearts
16 Queen }30 Ace diamonds
31 Seven } clubs
32 Eight }13 Seven } clubs
14 Eight }
15 Knave hearts
16 King clubs28 King } spades
29 Ace }
30 Ten clubs
31 Ten diamonds
32 Ace hearts (wide card)Combina-
tion.

You then shuffle them carefully, according to the method before described, and they will stand in the following order.

Cards. Numbers. Cards. Numbers.

brought up 34
1 Nine } 9 6 Ten clubs 10
2 King } spades 10 7 Ten diamonds 10
3 Seven } 7 8 Ten hearts 10
4 Seven diamonds 7 9 Ace clubs 1
5 Ace spades 1 10 Ace hearts (wide card) 1
carried up 34 total 66

Brought up 101
11 Eight hearts 8 22 Queen hearts 10
12 Eight spades 8 23 Nine 9
13 Seven hearts 7 24 Knave } diamonds 10
14 Nine clubs 9 25 Eight } 8
15 Knave } spades 10 26 King } 10
16 Ten } 10 27 Queen } 10
17 Queen clubs 10 28 Knave hearts 10
18 Nine hearts 9 29 King clubs 10
19 Queen spades 10 30 Ace diamonds 1
20 Knave clubs 10 31 Seven } clubs 7
21 King hearts 10 32 Eight } 8
carried up 101 total 194

When the cards are by shuffling disposed in this order, you cut them at the wide card, and pronounce that the cards you have cut off contain 66 points, and consequently the remaining part 194.

VIII. "The Inconceivable Repique (E)." When you would perform this experiment with the cards used in the last, you must observe not to disorder the first 10 cards in laying them down on the table. Putting those cards together, in their proper order, therefore, you shuffle them a second time in the same manner, and offer them to any one to cut, observing carefully if he cut them at the wide card, which will be the ace of hearts, and will then be at top; if not, you must make him, under some pretence or other, cut them till it is; and the cards will then be ranged in such order that you will repique the person against whom you play, though you let him choose (even after he has cut) in what suit you shall make the repique.

Order of the cards after they have been shuffled and cut.

1 Eight hearts 17 Nine } diamonds
2 Eight }
3 Knave } spades
4 Ten }
5 Queen } clubs
6 Knave }
7 King } hearts
8 Queen }
9 Eight }
10 King } diamonds
11 Queen }
12 Ace }

17 Nine } diamonds
18 Knave }
19 Nine hearts
20 Queen spades
21 Seven hearts
22 Nine clubs
23 Ten hearts
24 Ace clubs
25 Seven spades
26 Seven diamonds
27 Nine spades

The cards being thus disposed, you ask your adversary in what suit you shall repique him? If he say in clubs or diamonds, you must deal the cards by threes, and the hands will be as follows,

Elder	Younger.
Hearts, king	Clubs, ace
— queen	— king
— knave	— queen
— nine	— knave
— eight	— nine
— seven	Diamonds, ace
Spades, queen	— king
— knave	— queen
— eight	— knave
Diamonds, eight	— nine
Clubs, eight	Spades, ten
— seven	Hearts, ten
Rentrée, or take in of the elder.	Rentrée of the younger.
Seven spades	Ten clubs
Seven diamonds	Ten diamonds
Nine } spades	Ace hearts
King }	
Ace }	

If he against whom you play, who is supposed to be elder hand, has named clubs for the repique, and has taken in five cards, you must then lay out the queen, knave, and nine of diamonds, and you will have, with the three cards you taken in, a sixiem major in clubs, and quatorze tens. If he leaves one or two cards, you must discard all the diamonds.

If he requires to be repiqued in diamonds, then discard the queen, knave, and nine of clubs: or all the clubs, if he leaves two cards; and you will then have a hand of the same strength as before.

Note, If the adversary should discard five of his hearts, you will not repique him, as he will then have a septiem in spades: or if he only take one card: but neither of these any one can do, who has the least knowledge of the game. If the person against whom you play would be repiqued in hearts or spades, you must deal the cards by twos, and the game will stand thus:

Elder hand.	Younger hand.
King } diamonds	Ace } clubs
Knave }	King }
Nine }	Ace } diamonds
Eight }	Queen }
Queen }	Queen }
Knave }	Knave } spades
Nine } clubs	Ten }
Eight }	King }
Seven }	Queen }
Eight } hearts	Knave }
Seven }	Ten }
Eight spades	Nine }
Rentrée.	Rentrée.

Seven

(E) This manœuvre of piquet was invented by the countess of L— (a French lady), and communicated by her to M. Guyot.

Combina- tion.	Seven spades	Ten clubs
	Seven diamonds	Ten diamonds
	Nine } spades	Ace hearts
	King } Ace }	

If he require to be repiqued in hearts, you keep the quint to a king in hearts, and the ten of spades, and lay out which of the rest you please: then, even if he should leave two cards, you will have a fixiem major in hearts, and quatorze tens, which will make a repique.

But if he demand to be repiqued in spades; at the end of the deal you must dexterously pass the three cards that are at the bottom of the stock (that is, the ten of clubs, ten of diamonds, and ace of hearts) to the top (F), and by that means you reserve the nine, king, and ace of spades for yourself: so that by keeping the quint in hearts, though you should be obliged to lay out four cards, you will have a fixiem to a king in spades, with which and the quint in hearts you must make a repique.

Observe here likewise, that if the adversary lay out only three cards, you will not make the repique: but that he will never do, unless he be quite ignorant of the game, or has some knowledge of your intention.

This last stroke of piquet has gained great applause, when those that have publicly performed it have known how to conduct it dexterously. Many persons who understand the nature of combining the cards, have gone as far as the passing the three cards from the bottom of the stock, and have then been forced to confess their ignorance of the manner in which it was performed.

IX. "The Metamorphosed Cards." Provide 32 cards that are differently coloured; on which several different words are written, and different objects painted. These cards are to be dealt two and two, to four persons, and at three different times, shuffling them each time. After the first deal, every one's cards are to be of the same colour; after the second deal, they are all to have objects that are similar; and after the third, words that convey a sentiment.

Dispose of the cards in the following order.

Cards.	Colours.	Objects.	Words.
1	Yellow	Bird	I find
2	Yellow	Bird	In you
3	Green	Flower	Charming
4	Green	Flower	Flowers
5	White	Bird	To hear
6	White	Orange	Beauty
7	Red	Butterfly	My
8	Red	Flower	Notes
9	Red	Flower	In
10	Red	Butterfly	Shepherdes
11	Green	Butterfly	Lover
12	Green	Butterfly	Your
13	White	Flower	Of
14	White	Flower	an inconstant
15	Yellow	Orange	Image

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16	Yellow	Flower	Enchanting
17	White	Orange	Ardour
18	Yellow	Butterfly	My
19	Yellow	Butterfly	Phyllis
20	White	Bird	Birds
21	Red	Orange	Sing
22	Red	Orange	Dear
23	Green	Orange	and sweetness
24	Green	Orange	The
25	Green	Bird	Of
26	Green	Bird	Present
27	Yellow	Flower	As
28	Red	Bird	Changes
29	Red	Bird	Bosom
30	Yellow	Orange	Me
31	White	Butterfly	Your
32	White	Butterfly	I long

Combina-
tion.

The cards thus coloured, figured, and transcribed, are to be put in a case, in the order they here stand.

When you would perform this experiment, you take the cards out of the case, and show, without changing the order in which they were put, that the colours, objects, and words, are all placed promiscuously. You then shuffle them in the same manner as before, and deal them, two and two, to four persons, observing that they do not take up their cards till all are dealt, nor mix them together: and the eight cards dealt to each person will be found all of one colour. You then take each person's cards, and put those of the second person under those of the first, and those of the fourth person under those of the third. After which you shuffle them a second time, and having dealt them in the same manner, on the first person's cards will be painted all the birds: on the second person's cards, all the butterflies: on those of the third, the oranges; and on those of the fourth, the flowers. You take the cards a second time, and observing the same precautions, shuffle and deal them as before, and then the first person, who had the last time the birds in his hand, will have the words that compose this sentence:

Sing, dear birds; I long to hear your enchanting notes.

The second person, who the last deal had the butterflies, will now have these words:

Of an inconstant lover your changes present me the image.

The third, who had the oranges, will have this sentence:

As in my Phyllis, I find in you beauty and sweetness.

The fourth, who had the flowers, will have these words:

Charming flowers, adorn the bosom of my shepherdes.

It seems quite unnecessary to give any further detail, as they who understand the foregoing experiments will easily perform this.

Among the different purposes to which the doctrine of combinations may be applied, those of writing in cipher, and deciphering, hold a principal place. See the article CIPHER.

COMBINATION, in chemistry, signifies the union of

(F) The manner of doing this is explained in the article LEGERDEMAIN.

Combust
||
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of two bodies of different natures, from which a new compound body results. For example, when an acid is united with an alkali, we say that a combination betwixt these two saline substances takes place; because from this union a neutral salt results, which is composed of an acid and an alkali.

COMBUST, in astronomy. When a planet is in conjunction with the sun, or not distant from it above half its disk; it is said to be combust, or in combustion.

According to Argol, a planet is combust, or in combustion, when not above eight degrees and thirty minutes distant from the sun, either before or after him.

COMBUSTIO PECUNIÆ, the ancient way of trying mixed and corrupt money, by melting it down, upon payments into the Exchequer. In the time of king Henry II. a constitution was made, called the trial by combustion; the practice of which differed little or nothing from the present method of assaying silver. But whether this examination of money by combustion was to reduce an equation of money only of Sterling, viz. a due proportion of alloy with copper, or to reduce it to pure fine silver, does not appear. On making the constitution of trial it was considered, that though the money did answer *numero et pondere*, it might be deficient in value; because mixed with copper or brass, &c.

COMBUSTION, a term denoting the operation of fire upon any inflammable substance, by which it smokes, flames, and is reduced to ashes.

There is not a phenomenon in nature by which the attention of philosophers has been more engaged, nor which has puzzled them more to account for, than this very common operation. To explain it, theories have been invented the most opposite and contradictory to one another that can be imagined; and, till very lately, the state of science did not afford data sufficient to explain it in a rational manner.

¹
Theories of
ancient chemists.

By former chemists it was supposed, that the parts of the combustible body itself were converted into fire. Accordingly Sir Isaac Newton proposes it as a query, whether gross bodies and light are not convertible into one another? and many chemists of a more modern date have determined this question in the affirmative, by maintaining that the light of the sun is or contains phlogiston. The interference of the air, however, in most cases of combustion known to us, proved a difficulty in this theory almost, if not totally, unsurmountable; for if the fire proceeds entirely from the combustible body, what occasion is there for any third substance distinct both from the fire and that body to produce combustion? This naturally excited a conjecture, that the fire by which the combustible body is consumed, proceeds in reality from the air, and not from the body itself. And hence we see that Mr Hutchinson's system of fire and air being convertible into one another, might have passed as a rational human theory, if he had not attempted to force it upon mankind as a divine revelation. The modern discoveries in aerology, however, have entirely disproved this hypothesis with regard to our atmosphere considered as a whole, at the same time that they point out the true method, as far as our faculties seem capable of comprehending it, by which this mysterious

²
True principle on which combustion may be explained.

operation is performed. It is now almost universally known, that the air we breathe is composed of two kinds of elastic fluids, only one of which (called *dephlogisticated, pure, empyreal, or vital air*) contributes to the support of flame, as well as of animal life; and this part is found to be by far the least in quantity of the atmosphere we breathe. It is computed from good observations, that, among the various component parts of our atmosphere, there is about one-fourth, $\frac{1}{4}$ according to Mr Scheele, or one-fifth according to Mr Cavendish, contained in it; and to this small part alone is owing the combustion of inflammable bodies.

Since the establishment of this important fact, several theories of combustion have been formed. According to M. Lavoisier, dephlogisticated air is a compound of two substances intimately combined; one is called by him the *oxygenous principle*, and the other *specific elementary fire*. During the combustion of sulphur, phosphorus, inflammable air, or any other substance of that kind, the oxygenous principle of the dephlogisticated air, according to him, combines with these bodies, to which it has a strong attraction, and forms new compounds of salts and other bodies; at the same time that the elementary fire contained in these is set loose, and becomes sensible, producing heat and flame, according to circumstances. Thus the fire produced in combustion does not proceed from the burned body, but from the decomposition of the dephlogisticated air, in which it is contained in a latent and insensible state; while its oxygenous principle combines with the sulphur, phosphorus, or inflammable air, and forms vitriolic and phosphoric acids, or pure water. In like manner it is also supposed by this theory, 1. That metals are substances absolutely simple. 2. That metallic calces are true compounds formed by the oxygenous part of pure air with the metallic particles; and, 3. That pure water is a similar compound of the same principle with inflammable air.

According to Fourcroy, combustible bodies are those which have a strong attraction to combine or unite with pure or dephlogisticated air; and combustion is nothing else but the act of that combination. This assertion is found on the following facts: 1. That no substance can be burnt without air; 2. That the purer this air is, the more rapid is the combustion; 3. That in combustion an absorption or waste of air always takes place; and, 4. That the residuum contains often a very sensible quantity of that pure air which it absorbed, and which may sometimes be extracted from it.

In Mr Scheele's new theory of heat, fire, light, and phlogiston, he considers heat and light themselves as compound substances. The former, according to him, consists of phlogiston and empyreal air. The calces of gold, reducible by heat alone, in a retort, show that phlogiston is contained in heat; because it combines with the calces to revive them, and the dephlogisticated air is found in the receiver. The precipitate *per se* of mercury, if revived in this manner, affords, according to our author, another instance of the truth of his doctrine: "If phlogiston alone (says he) could pass through the retort, there would not be found the empyreal air in the receiver, and the ignoble metals might be revived in the same manner."

Light, according to Mr Scheele, is a compound containing

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³
M. Lavoisier's theory.

⁴
Fourcroy's theory.

⁵
Scheele's theory.

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containing phlogiston and heat, from which both may separate themselves in proper circumstances. A solution of silver in nitrous acid mixed with chalk, and exposed to the sunshine, is revived into a metallic form by the phlogiston of light. Nitrous acid also in a glass vessel, receives phlogiston from light, and becomes of an orange colour: but if the glass be painted black, the acid receives the heat, not the phlogiston. Even the various coloured rays of light, according to our author, contain unequal shares of phlogiston; since the violet rays part more easily with their phlogiston to revive metals than any other. When light is not stopped in its passage, no heat is perceived; but if stopped in its course, the opposing body receives heat, and sometimes phlogiston. Light seems therefore to be the matter of heat, loaded with a superabundant quantity of phlogiston. That which comes out from a furnace, produces heat on the surrounding bodies, which ascends with the rarefied air; proceeds forward in straight lines; and may be reflected from polished surfaces, with this peculiarity, that a concave glass mirror retains the heat, whilst it reflects the light; for although its focus is bright, yet it is not warm. A pane of glass also put before a burning mirror, retains the heat, and allows the light to pass through it.

Fire is the more or less heated, or more or less luminous state of bodies, by which they are resolved into their constituent parts, and entirely destroyed. It requires, that they be previously heated in contact with air: for to every combustible body a certain quantity of heat must be communicated, in order to set it in the fiery commotion.

Combustion is the action of heat penetrating the pores of bodies, and destroying their cohesion: in this case the body parts with its phlogiston, provided there be a substance present which has a strong attraction for the inflammable principle. If the heating be performed in open air, the empyreal part, on account of its stronger attraction, unites with the inflammable principle, which is thus set at liberty; from which union the heat is compounded; and scarcely is this heat generated, when the combustible body is still more expanded by it than in the beginning, and its phlogiston more laid open. The more the heat is increased, the more minute are the particles into which the combustible body is dissolved. The empyreal air meets more surfaces; consequently comes in contact with more phlogiston: and, according to its nature, forms an union with a greater quantity of it, which produces a radiant heat. At this moment the constituent parts of the combustible body are so much disunited by the still increasing heat, that the empyreal air, continuing to pour in upon it in streams, attracts the phlogiston in still greater quantities: and hence the most elastic substance, light, is composed; which, according to the quantity of combustible matter, shows various colours.

6
Dr Crawford's theory.

The last theory we shall here take notice of is that of Dr Crawford.—He has by a great number of experiments endeavoured to show, that bodies which contain a large portion of phlogiston, possess but a small share of specific heat or fire; on the contrary, that those with a great share of this last, contain but little phlogiston; and lastly, those which are deprived of

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phlogiston, increase their capacity for specific fire. Thus, when regulus of antimony is deprived of its phlogiston, by calcination, which is then called *diaphoretic antimony*, it nearly triples its specific fire. The same change takes place in *crocus martis* and in iron. This fact is generally true, whatever be the nature of the substance: and even the aeriform ones are in the same case, for phlogisticated air has very little specific fire, common air has more of it, and dephlogisticated air shows a most prodigious quantity. From these facts it is clear, that phlogiston and fire are distinct, and incompatible substances: so that when one enters into the composition of any body, the other of course is expelled from it. Thus metals are calcined in consequence of a double attraction, by which the metal imparts its phlogiston to the air, while the air communicates its fire to the metallic calces; which is further confirmed by the air that is found in metallic calces, whose increased weight by calcination corresponds to the air that is expelled from them by their reduction to a metallic state.

All combustible bodies are absolutely in the same case. By these are meant such bodies as contain a large quantity of phlogiston in their composition, but loosely adherent to them. Dephlogisticated air, which is greatly loaded with specific fire, has at the same time a strong attraction for phlogiston; and, in the act of combustion, communicates its fire to the combustible body, whilst the air becomes phlogisticated or loaded with phlogiston. Thus we find, that sulphur contaminates the air, when burned, by the phlogiston it throws into it, and the produced vitriolic acid, if any, becomes impregnated with the same.

In some cases the most intense heat or sensible fire is produced in the combustion; but in others it is very moderate. This variation generally depends on the quantity and quality of the vapours produced during the combustion: when these are very inconsiderable, and the residuum cannot absorb the fire which is emitted by the air, the remainder is precipitated, or diffused all around, and produces a very sensible heat. On the contrary, if the vapours are capable of absorbing it, very little heat is produced. We know, by the most certain experiments, that, for instance, the vapour of water absorbs about 800 degrees of heat beyond that of its boiling state; from whence it follows, that, whenever there is a quantity of watery vapours produced by combustion, very little sensible fire must be felt. So when spirits of wine are fired, the heat then produced by the combustion is very inconsiderable, the greater part being absorbed by the watery vapours that are then produced: but when the phosphorus of Kunkel is set on fire, the heat is very strong; there being but a small quantity of acid to carry off the specific fire that is set loose.

These are the principal theories of combustion that M. Magellan⁷ have appeared. M. Magellan, from whose notes on lan's remarks, Cronstedt's Mineralogy the above account is taken, objects to M. Lavoisier's opinion, that the oxygenous principle cannot be shown to our senses, nor is it better demonstrated than the *phlogiston* supposed by the great Stahl and his followers. M. Fourcroy's system he supposes to be less objectionable: but to Scheele he objects from Mr Kirwan, 1. That in no instance it appears that phlogiston penetrates glass, much less a compound

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compound of pure air and phlogiston; and, 2dly, That if Mr Scheele's notions were true, then other metallic calces, or at least black manganese, would be reduced by heat alone: for this calx dephlogisticates nitrous acid, and has a stronger affinity with phlogiston than it; and therefore ought to decompose the heat with as great facility as the nitrous acid, or even with greater on account of its greater attraction. The former objection M. Magellan does not suppose to be altogether conclusive, as there are many combinations (he says) of two or more substances that pass through bodies, each of which would be stopped before they were combined; and what Mr Scheele has said on 'light seems to prove that glass is not always quite impervious to phlogiston; but the latter he deems altogether unanswerable.

Having thus rejected three of these theories, he acquiesces in that of Dr Crawford, which, he tells us, "is the most satisfactory concerning the nature and process of combustible bodies and of their combustion, so far as the present state of our knowledge has opened the field of our views into the operations of nature." Before such a full assent, however, is given to any theory, it is altogether necessary that it should be consistent with every known fact, as far as that fact can be investigated by us in our present state of knowledge; and that this is not the case with the theories either of Fourcroy, Scheele, or Crawford, will appear from the following considerations.

8
Objections
to M. Four-
croy's theo-
ry.

I. With regard to that of Fourcroy, it is evidently deficient in one of the essential requisites to produce combustion, even *fire* itself; for if combustion depends only on the *attraction* between combustible bodies and pure air, then it ought to take place on all occasions wherever pure air and combustible bodies are presented to each other. But this is not the case; for though we put a piece of unlighted charcoal into a jar full of dephlogisticated air, no combustion will ensue. To produce this it is necessary that the charcoal be already, in part at least, in a state of combustion, or that fire be applied to it from without. This theory therefore, instead of explaining the matter, gives not the smallest insight into it; since we are perpetually left to seek for the cause of the fire which produced that in question: for the combination of a combustible body with air is the *effect* of combustion, not the cause.

9
To Mr
Scheele's.

II. Mr Scheele's theory is so exceedingly contrary to the common notions of mankind, that it can scarce ever be seriously believed. The pure light of the sun can never be supposed by any mortal to consist principally of a substance as gross as the foot of our chimneys, without a degree of evidence of which the subject is quite incapable.

10
To Mr
Craw-
ford's.

III. Under the article CHEMISTRY, Dr Crawford's theory of heat is fully considered, and found to be insufficient. It is there shown that the degree of *specific heat* contained in bodies cannot be measured by

any method yet known to us; that the phrase, *quantity of heat*, so frequently made use of by Dr Crawford and others, is vague, inaccurate, and improper; as expressing only the degree of sensible heat *extricated, produced, generated*, or which becomes perceptible in certain circumstances by us, without regard to the real quantity contained in the body itself, either originally, or after it has parted with that in question. Thus all experiments founded on the *quantities* of specific heat contained in different bodies must be fallacious and inconclusive. Not to insist, however, on these general arguments, it is contrary to fact, that "bodies which contain a large portion of phlogiston contain but a small share of specific heat," and *vice versa*, as the Doctor asserts: which will appear from the following considerations.

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1. The only methods by which we can measure the *quantity* of any material substance is either by its bulk or weight.

2. Whatever occupies space, and resists the touch, we have a right to call a material substance, whether we can see it and weigh it or not. Thus air, which is invisible, and not very easily ponderable, is universally allowed to be a *substance* and not a *quality*.

3. In cases where we cannot conveniently measure the weight of any substance, its quantity must always be judged of by its bulk. Thus the quantity of air contained in a bladder, or in a bellows, is always judged of by the degree of expansion of either.

4. Heat, which is still more subtle than air, is measured in this way, as Dr Crawford himself acknowledges; for the expansions of mercury are in an arithmetical progression expressive of the real degrees of heat.

5. Applying this rule to bodies in general, we must conclude, that the expansions of all bodies will be in proportion to the degrees of heat which they contain. Thus, if a body is expanded by heat to double its bulk, and in this state remains even when the heating cause is withdrawn, we may then say with justice, that this body contains double the quantity of *latent* or specific heat that it did before, and so on (A).

6. As the vapour of water is found to absorb a vast quantity of heat, and likewise to become prodigiously expanded in comparison with the water from whence it is produced, we may justly conclude, that the quantity of heat absorbed, or of *specific heat* contained in the steam, is to the specific heat contained in the water as the bulk of the steam is to that of the water. It is difficult indeed to determine how much steam exceeds in bulk the water from which it is derived: but from some experiments, Dr Black concludes, that it is augmented in bulk between 1600 and 1700 times; and from the great quantity of heat emitted by steam during its condensation, which in some cases exceeds 1000 degrees of Fahrenheit, we have reason to believe

(A) This is not contradictory to the observation that the expansions of all bodies are not in proportion to the degree with which they are heated, nor equal at different times. It is the degree of heat *absorbed* and entangled among the particles of the body which expands it, not that which flows out from it, and affects our senses or the thermometer. Thus, though a body is heated to 100 degrees, it may absorb only 10; and after it has done so, it may require 300 or 400 degrees more to cause it absorb other ten.

Combu-
stion.

believe that the quantity of its expansion is proportionable to that of the heat absorbed.

7. As we thus are ascertained, by the great expansion of aqueous vapour, that it has absorbed a vast quantity of heat, it will evidently follow, that from the expansion of other substances we ought also to know the quantity of heat absorbed by them. To apply this then to the present case. In Dr Priestley's experiments on the conversion of charcoal into inflammable air, he found, that one grain of charcoal, dispersed by the heat of the sun *in vacuo*, gave six ounce measures of inflammable air. In another experiment, he found that $2\frac{1}{2}$ grains of charcoal gave $15\frac{1}{2}$ ounce measures of the same kind of air. But from a computation of the weight of the air so produced, it appears, that at least an equal quantity of water with that of the charcoal goes to the composition of the aerial fluid. In measuring this expansion, therefore, we may allow one-half for that of the water requisite to form the inflammable air; and hence the grain of charcoal, properly speaking, absorbs only three ounce measures of fire. That this expansion was the effect of fire is very evident: for there was nothing else present but fire, or the concentrated light of the sun; the experiment being performed by means of a burning glass *in vacuo*. It cannot be a fact then, as Dr Crawford asserts, that a phlogistic body contains but a small quantity of specific heat; for here so small a quantity as one grain of charcoal was made to contain as much specific fire as is equivalent in bulk to three ounce measures. It appears therefore, that the quantity of specific fire contained in bodies is not determined by their being combustible or not, or by their containing phlogiston or not: much less can we believe that heat and phlogiston are so incompatible with one another, that where "one enters into the composition of any body the other is of course expelled from it;" since here we find the purest fire we know united in vast quantity with the purest phlogiston we know, and both together constituting one of the most inflammable substances in nature, viz. inflammable air.

8. In like manner must the last part of the Doctor's theory be erroneous, viz. that "in the act of combustion the dephlogisticated air communicates its fire to the combustible body." In the instance just now adduced, the combustible substance, inflammable air, contains already as much fire as it can hold; and according to the general rule in these cases, if it was to absorb more fire, it ought to become still more expanded. But instead of this, when dephlogisticated and inflammable air mixed together in due proportion, are set on fire, they shrink in a manner into nothing; so that it is plain, instead of one communicating its fire to the other, both of them throw out almost all the fire they contain; so that they are no longer air, but *water*, or some other substance about which philosophers are not yet agreed.

9. Dr Crawford's theory of combustion is liable to the very same objection with that of Fourcroy, viz. that it sets aside the necessity of any external cause to set on fire the combustible bodies. If dephlogisticated air attracts the phlogiston of the combustible body, and the phlogiston in the latter attracts the fire of the dephlogisticated air, the consequence of which is combustion; then, wherever dephlogisticated and inflammable air are

mixed, combustion ought immediately to ensue. But this is not the case. A candle, a spark of electricity, or, in a word, some body *already in a state of combustion*, must be applied before we can produce the effect in question. We must therefore seek for the cause of combustion in the burning body applied, which will be found equally inexplicable: and thus we cannot proceed a single step in real knowledge, though assisted by all that Dr Crawford has advanced.

10. The theory of M. Lavoisier, notwithstanding M. Magellan's criticism, seems to come much nearer the truth than that of Dr Crawford. With regard to the existence of what Lavoisier calls the oxygenous principle, it is certainly established on as sure grounds as that of any invisible substance can be. M. Magellan complains, without reason, that it "cannot be shown to our senses." It has not yet indeed been made *visible, per se*; but it is found to increase the weight of bodies very sensibly. Perhaps, indeed, it may not be an *oxygenous* or acidifying principle; perhaps it may be water, or some other substance; but still it is *something* which, by being combined with elementary fire, is expanded into a vast bulk, and which, by being deprived of this fire, shrinks into its former dimensions. Thus it manifests itself to be a real substance; and not only so, but a terrestrial gravitating substance; and which, even when lightened by a mixture of charcoal so as to constitute the solid part of fixed air, has been shown nearly to equal the density of gold. In this respect, therefore, M. Lavoisier's theory is faultless, as well as in that which affirms that in the act of combustion the dephlogisticated air parts with its fire: but it is imperfect in this respect, that he does not consider the quantity of fire contained in the inflammable body, which is thrown out at the same time, nor the occasion there is for some body in a state of actual inflammation to begin the combustion. That the combinations mentioned by him do actually take place is not denied; but they are undoubtedly *consequences* of the combustion, not causes of it, as they are generally supposed. To understand this subject fully, therefore, it will still be necessary to consider farther,

11. Under the article CHEMISTRY, already quoted, it is shown that heat and cold are not essentially distinct from one another, but that heat consists in the motion of a certain subtle and invisible fluid from a centre towards a circumference, and that cold consists in the action of the same fluid from a circumference to a centre. In other words, when elementary fire acts from any body outwards, we say that body is *hot*, because it heats other bodies; but when it flows from others into any particular body, we call the latter *cold*, as depriving the neighbouring bodies of part of their relative quantity of heat. We may farther illustrate this by the example of electricity, where the fluid rushing out from any body produces a kind of electricity called *positive*; but, when entering into it, produces another, opposite in many respects to the former, called *negative* electricity. In like manner all bodies in the act of throwing out elementary fire are *hot*, and in the act of absorbing it *cold*. Vapours of all kinds, therefore, ought to be naturally cold: and experience shows that they really are so; for, by means of evaporation, very intense degrees of cold may be produced. See COLD and EVAPORATION.

Combu-
stion.

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M. Lavoisier's theory preferable to the former.

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12. In most terrestrial bodies the heat easily flows out from one to another, and therefore they are in a manner indifferent as to the state of being either *hot* or *cold*: but in vapours, the heat, having once flowed into them, continues to have a tendency to do so without regard to the external temperature of bodies. Hence these fluids are naturally cold to the touch; and those who have been immersed in clouds on the tops of high mountains or otherwise, have uniformly related that they found the vapour excessively cold; and thus our atmosphere, unless supplied by the powerful influence of the sun-beams, not only becomes extremely cold itself, but likewise cools to an extreme degree the surface of the earth and every thing upon it.

13. In all cases, therefore, where a quantity of vapour, whether inflammable or not, is collected into one place, there is a constant influx, or at least a constant pressure inwards of the elementary fire existing invisibly all around: which pressure must continue until by some means or other the flow or pressure of ethereal fluid be reversed, and instead of tending from without inwards, is made to tend from within outwards.

14. One method of reversing this influx is by external pressure, or by any other means bringing the particles of vapour nearer to one another. On this subject, a treatise has been written by Dr Webster of Edinburgh, in which he endeavours to establish the doctrine, that condensation is in all cases the cause of heat. That it really is the immediate cause, in a great many cases, is very certain; but it is equally evident that, even in these cases, the cause of *condensation* must be the ultimate cause of heat. Thus, if a quantity of air be violently compressed in an air-gun, it is found to become hot; but though the compression be the immediate cause, the force by which the compression is occasioned must be the ultimate cause of the heat. The immediate agent, however, by which the heat is produced, is neither the compressing cause nor the condensation, but the efflux of elementary fire from the air, by bringing the particles of the latter nearer to each other. In like manner, when iron is hammered until it becomes hot, the metal may probably be supposed to be condensed, and the elementary fire to be squeezed out of it as water from a sponge: but it is neither the action of the hammer, nor the approximation of the particles to each other, that is the cause of heat; but the flux of elementary fire directed from the iron every where from within outwards.

15. Thus we may now at once explain the action of combustion; to do which, we shall take the example of a mixture of inflammable and dephlogisticated air already mentioned. When these are mixed together, there is a constant pressure of the elementary fluid inwards from all quarters into the aerial vapours, by which their elasticity and form as airs are preserved; and this pressure will continue as long as we let them remain undisturbed. But when a burning body is brought into contact with them, the influx of the elementary fire is not only prevented but reversed in that part which comes in contact with the burning body. Thus the whole constitution of both inflammable and dephlogisticated airs is destroyed in a moment; for the subtle fluid, feeling (if we may use the expression) that the pressure is lessened in one place, instantly directs its whole force thither; and the pressure inwards being

thus reversed in this part instantly becomes so in every other, and the whole fluid contained in both is discharged with a bright flash and loud explosion.

16. In a similar manner may we explain the combustion of solid bodies. None of these can be ignited without the assistance of external fire. This in the first place rarefies some part of them into vapour; which by means of dephlogisticated air is decomposed in the manner already mentioned; while, by means of the heat thrown out, a fresh quantity of vapour is raised, at the same time that the fire is augmented, and would continue to be so *in infinitum*, as long as fuel could be supplied. When no more inflammable vapour can be raised, the combustion ceases of course; and the remainder becomes charcoal, ashes, slag, &c. according to its different nature, or the combinations it is capable of assuming with the terrestrial or gravitating part of the pure air by which the fire was supplied.

17. It may now be asked, If the cause of combustion be merely the reversing of the influx of elementary fire, why cannot inflammable vapours be fired *in vacuo*, by means of heat applied to some part of them externally? Thus, as inflammable air has a constant influx of elementary fire into it, why may not this influx be reversed, and a flame produced, not so violent indeed as with dephlogisticated air, but sufficient to authorize us to say that such a body was actually in the state of combustion? But this, we know, cannot be the case unless some pure air be admitted: for a stream of inflammable air, if nothing else be admitted, will as effectually put out a fire as a stream of water. Here, however, we may reply, that this would suppose inflammable air to be destroyed by the very power by which it was produced. It seems to be the nature of all vapours to absorb heat without any limitation, as is evident by the increase of elasticity in them by an increase of heat. Elementary fire is one of the component parts of vapour, and no substance can be decomposed merely by the action of one of its component parts. Something heterogeneous must therefore be added, on which one or both of the component parts may act; and then the vapour will be decomposed *in vacuo* as well as in the open air, though with less obvious circumstances. Thus charcoal once dispersed by heat into inflammable air cannot be decomposed merely by heat, because its tendency is always to absorb this element: But if into a jar full of inflammable air we introduce a quantity of calx of lead, and then heat it, the pressure of the fluid is interrupted in that part where the calx is, and presently becomes reversed by means of the additional heat there, which, at the same time that it furnishes no more charcoal, affords a substance with which the charcoal in the inflammable air may unite. The air is therefore decomposed, though too slowly to produce actual flame. For combustion, therefore, it is necessary that the following circumstances should concur: 1. The mixture of two vapours containing a great quantity of specific fire each. 2. That the terrestrial bases of these vapours should be capable of acting upon one another; but no third substance capable of immediately absorbing the fire should be present. 3. The presence of actual fire in some part, to lessen the pressure of the elementary fluid, set it in motion, and reverse it. This is the case when inflammable and dephlogisticated

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Objections
answered.

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phlogisticated airs are mixed together. Both these contain specific fire in great quantity. The basis of the one, known to be charcoal, is capable of being united by means of heat to the basis of dephlogisticated air, and of forming with it in some cases fixed air, in others water, or some other substance, according to their various proportions; and after this union is formed, there is no third substance by which the elementary fire may be absorbed. The inflamed body by which they are set on fire first lessens the inward pressure of the elementary fire on one part, by which the bases are allowed to approach nearer each other, and to form a chemical union according to the general observation: But this union cannot be effected without the emission of part of the elementary fire, which being contained in the mixture in great quantity, produces a bright flame. This lessens the pressure still more; a new chemical union and a new flame are produced; and so on as long as any of the materials remain.

When all these circumstances concur, it is not a property peculiar to dephlogisticated air to support flame, though it seems to be so to preserve animal life. It is well known that pyrophorus will burn in common nitrous air, and a candle will burn with an enlarged flame in that kind called *dephlogisticated nitrous air*. But where any of the concurrent circumstances above mentioned is wanting, no combustion will be produced. Thus, though the steam of water contains a vast quantity of specific fire, and though it is decomposed by passing over red-hot iron, yet no combustion is produced; because, in the very moment of extrication, the elementary fire finds a quantity of phlogiston either in the iron, the water itself, or both, with which it combines, and forms inflammable air, but without any flame.

With regard to the substances which have the property of taking fire spontaneously, as PHOSPHORUS and PYROPHORUS, see these articles.

COMEDY, a sort of dramatic poetry, which gives a view of common and private life, recommends virtue, and corrects the vices and follies of mankind by means of ridicule. See the article POETRY.

This last kind alone was received among the Romans, who nevertheless made a new subdivision of it into ancient, middle, and new, according to the various periods of the commonwealth. Among the ancient comedies were reckoned those of Livius Andronicus; among the middle those of Pacuvius; and among the new ones, those of Terence. They likewise distinguished comedy according to the quality of the persons represented, and the dress they wore, into togatæ, prætextatæ, trabeatæ, and tabernariæ, which last agrees pretty nearly with our farces. Among us, comedy is distinguished from farce, as the former represents nature as she is; the other distorts and overcharges her. They both paint from the life, but with different views: the one to make nature known, the other to make her ridiculous.

COMENIUS (John Amos), a grammarian and Protestant divine, born in Moravia in 1592. He was eminent for his design to introduce a new method of teaching languages; for which purpose he published some essays in 1616, and had prepared some others, when the Spaniards pillaged his library, after having

taken the city of Fulnec, where he was minister and master of the school. Comenius fled to Lesna, a city of Poland, and taught Latin there. The book he published in 1631, under the title of *Janua Linguarum reſerata*, gained him a prodigious reputation, inſomuch that he was offered a commiſſion for regulating all the ſchools in Poland. The parliament of England deſired his aſſiſtance to regulate the ſchools in that kingdom. He arrived at London in 1641; and would have been received by a committee to hear his plan had not the parliament been taken up with other matters. He therefore went to Sweden, being invited by a generous patron, who ſettled a ſtipend upon him that delivered him from the fatigues of teaching; and now he employed himſelf wholly in diſcovering general methods for thoſe who inſtructed youth. In 1657 he published the different parts of his new method of teaching. He was not only taken up with the reformation of ſchools; but he alſo filled his brain with prophecies, the fall of Antichriſt, Millennium, &c. At laſt Comenius took it into his head to addreſs Louis XIV. of France, and to ſend him a copy of the prophecies of Drabicius; inſinuating that it was to this monarch God promiſed the empire of the world. He became ſenſible at laſt of the vanity of his labours, and died in 1671.

COMET, an opaque, ſpherical, and ſolid body like a planet, performing revolutions about the ſun in elliptical orbits, which have the ſun in one of their foci.

There is a popular diviſion of comets into *tailed*, *bearded*, and *hairy* comets: though this diviſion rather relates to the different circumſtances of the ſame comet, than to the phenomena of ſeveral. Thus when the light is weſtward of the ſun, and ſets after it, the comet is ſaid to be *tailed*, becauſe the train follows it in the manner of a tail: when the comet is eaſtward of the ſun, and moves from it, the comet is ſaid to be *bearded*, becauſe the light marches before it in the manner of a beard. Laſtly, when the comet and the ſun are diametrically oppoſite (the earth between them), the train is hid behind the body of the comet, except a little that appears round it in form of a border of *hair*: and from this laſt appearance the word comet is derived; as *κομήτης*, *cometa*, comes from *κομήν*, *coma*, hair. But there have been comets whoſe diſk was as clear, as round, and as well defined, as that of Jupiter, without either tail, beard, or coma. See ASTRONOMY-Index.

COMETARIUM, a curious machine, exhibiting an idea of the revolution of a comet about the ſun. See ASTRONOMY-Index.

COMETEAN, a town of Bohemia in the circle of Saltz, with a handſome town-houſe. It was taken by ſtorm in 1421, and all the inhabitants, men, women, and children, put to the ſword. It is ſeated in a fertile plain, in E. Long. 13. 25. N. Lat. 50. 30.

COMETES, in botany: A genus of the monogynia order, belonging to the tetrandria claſs of plants. The involucre is tetraphyllous and triſlorous; the calyx tetraphyllous; the capſule tricocous.

COMFREY. See SYMPHYTUM.

COMINES (Philip de); an excellent hiſtorian, born of a noble family in Flanders in 1446. He lived in a kind of intimacy with Charles the Bold, duke of Burgundy, for about eight years; but being ſeduced

Comet
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Comines.

Comines to the court of France by Louis XI. he was highly promoted by him, and executed several successful negotiations. After this king's death he experienced many troubles on account of being a foreigner, by the envy of other courtiers, and lay long in prison before he was discharged: he died in 1509. Comines was a man of more natural abilities than learning; he spoke several living, but knew nothing of the dead languages: he has left behind him some memoirs of his own times, that are admired by all true judges of history. Catharine de Medicis used to say, that Comines made as many heretics in politics as Luther had in religion.

COMINES, a town of French Flanders on the lines which the French have made to defend their country against the Austrian Netherlands. It is situated on the river Lie, in E. Long. 3. 1. N. Lat. 50. 30.

COMITATUS, in law, a county. Ingulphus tells us, that England was first divided into counties by King Alfred; and the counties into hundreds, and these again into tythings: and Fortescue writes, that *regnum Angliæ per comitatus, ut regnum Franciæ per ballivatus distinguitur*. Sometimes it is taken for a territory or jurisdiction of a particular place; as in Mat. Paris, anno 1234. See **COUNTY**.

COMITIA, in Roman antiquity, were general assemblies of the people, lawfully called by some magistrate for the enjoyment or prohibition of any thing by their votes.

The proper comitia were of three sorts; *curiata*, *centuriata*, and *tributa*; with reference to the three grand divisions of the city and people into *curiæ*, *centuriæ*, and *tribes*: For, by comitia *calata*, which we sometimes meet with in authors, in elder times, were meant all the comitia in general; the word *calata* from *καλεω*, or *calo*, being their common epithet; though it was at last restrained to two sorts of assemblies, those for the creation of priests, and those for the regulation of last wills and testaments.

The *comitia curiata* owe their origin to the division which Romulus made of the people into 30 *curiæ*; ten being contained in every tribe. They answered in most respects to the parishes in our cities, being not only separated by proper bounds and limits, but distinguished too by their different places set apart for the celebration of divine service, which was performed by particular priests (one to every *curia*), with the name of *curiones*.

Before the institution of the *comitia centuriata*, all the grand concerns of the state were transacted in the assembly of the *curiæ*; as the election of kings and other chief officers, the making and abrogating of laws, and the judging of capital causes. After the expulsion of the kings, when the commons had obtained the privilege to have tribunes and ædiles, they elected them for some time at these assemblies; but that ceremony being at length transferred to the *comitia tributa*, the *curiæ* were never convened to give their votes, except now and then upon account of making some particular law relating to adoptions, wills, and testaments, or the creation of officers for an expedition; or for electing some of the priests, as the *flamines*, and the *curio maximus*, or superintendant of the *curiones*, who were themselves chosen by every particular *curia*.

The power of calling these assemblies belonged at first only to the kings; but upon the establishment of the democracy, the same privilege was allowed to most of the chief magistrates, and sometimes to the pontifices.

The persons who had the liberty of voting here were such Romans citizens as belonged to the *curiæ*; or such as actually lived in the city, and conformed to the customs and rites of their proper *curiæ*; all those being excluded who dwelt without the bounds of the city, retaining the ceremonies of their own country, though they had been honoured with the *jus civitatis*, or admitted free citizens of Rome. The place where the *curiæ* met was the *comitium*, a part of the forum: No set time was appointed for the holding these, or any other of the *comitia*, but only as business required.

The people being met together, and confirmed by the report of good omens from the augurs (which was necessary in all the assemblies), the rogatio, or business to be proposed to them, was publicly read. After this (if none of the magistrates interposed), upon the order of him that presided in the *comitia*, the people divided into their proper *curias*, and consulted of the matter; and then the *curias* being called out, as it happened by lot, gave their votes man by man, in ancient times *viva voce*, and afterwards by tablets; the most votes in every *curia* going for the voice of the whole *curia*, and the most *curiæ* for the general consent of the people.

In the time of Cicero, the *comitia curiata* were so much out of fashion, that they were formed only by 30 lictors representing the 30 *curiæ*; whence, in his second oration against Rullus, he calls them *comitia adumbrata*.

The *comitia centuriata* were instituted by Servius Tullius; who, obliging every one to give a true account of what he was worth, according to those accounts, divided the people into six ranks or classes, which he subdivided into 193 centuries. The first classis, containing the equities and richest citizens, consisted of 98 centuries. The second, taking in the tradesmen and mechanics, consisted of 22 centuries. The third, 20. The fourth, 22. The fifth, 30. The sixth, filled up with the poorer sort, but one century; and this, though it had the same name with the rest, yet was seldom regarded, or allowed any power in public matters. Hence it is a common thing with the Roman authors, when they speak of the classes, to reckon no more than five, the sixth not being worth their notice. This last classis or order was divided into two parts or orders; the *proletarii* and the *capite censi*. The former, as their name implies, were designed purely to stock the republic with men, since they could supply it with so little money; and the latter, who paid the lowest tax of all, were rather counted and marshalled by their heads than by their estates.

Persons of the first rank, by reason of their pre-eminence, had the name of *classici*; whence came the name of *classici authores* for the most approved writers. All others, of what classis soever, were said to be *infra classem*. The assembly of the people by centuries was held for the electing of consuls, censors, and prætors; as also for the judging of persons accused of what they called

Comitia. called *crimen perduellionis*, or actions by which the party had showed himself an enemy to the state, and for the confirmation of all such laws as were proposed by the chief magistrates, who had the privilege of calling these assemblies.

The place appointed for their meeting was the *campus martius*; because in the primitive times of the commonwealth, when they were under continual apprehensions of enemies, the people, to prevent any sudden assault, went armed, in martial order, to hold these assemblies; and were for that reason forbidden by the laws to meet in the city, because an army was upon no account to be marshalled within the walls: yet, in latter ages, it was thought sufficient to place a body of soldiers as a guard in the *janiculum*, where an imperial standard was erected, the taking down of which denoted the conclusion of the comitia.

Though the time of holding these comitia for other matters was undetermined; yet the magistrates, after the year of the city 601, when they began to enter on their place, on the kalends of January, were constantly designed about the end of July and the beginning of August.

All the time between their election and confirmation they continued as private persons, that inquisition might be made into the election, and the other candidates might have time to enter objections, if they met with any suspicion of foul dealing. Yet, at the election of the censors, this custom did not hold; but as soon as they were elected, they were immediately invested with the honour.

By the institution of these comitia, Servius Tullius secretly conveyed the whole of the power from the commons: for the centuries of the first and richest class being called out first, who were three more in number than all the rest put together, if they all agreed, as generally they did, the business was already decided, and the other classes were needless and insignificant. However, the three last scarce ever came to vote.

The commons, in the time of the free state, to remedy this disadvantage, obtained, that before they proceeded to voting any matter at these comitia, that century should give their suffrages first upon whom it fell by lot, with the name of *centuria prerogativa*; the rest being to follow according to the order of their classes. After the constitution of the 35 tribes into which the classes and their centuries were divided, in the first place, the tribes cast lots which should be the *prerogative tribe*; and then the centuries of the tribes for the honour of being a prerogative century. All the other tribes and centuries had the appellation of *jure vocate*, because they were called out according to their proper places.

The prerogative century being chosen by lot, the chief magistrate, sitting in a tent in the middle of the *campus martius*, ordered that century to come out and give their voices; upon which they presently separated from the rest of the multitude, and came into an inclosed apartment, which they termed *septa*, or *ovilia*, passing over the *pontes* or narrow boards laid there for the occasion; on which account, *de ponte dejici* signifies to be denied the privilege of voting, and persons thus dealt with are called *depontani*.

At the hither end of the *pontes* stood the *diribitores*

(a sort of under officers so called from their marshalling the people), and delivered to every man, in the election of magistrates, as many tables as there appeared candidates, one of whose names was written upon every tablet. A proper number of great chests were set ready in the *septa*, and every body threw in which tablet he pleased.

By the chests were placed some of the public servants, who taking out the tablets of every century, for every tablet made a prick or a point in another tablet which they kept by them. Thus, the business being decided by most points, gave occasion to the phrase *omne tulit punctum*, and the like.

The same method was observed in the judiciary process at these comitia, and in the confirmation of laws; except that, in both these cases, only two tablets were offered to every person; on one of which was written U. R. and on the other A, in capital letters; the two first standing for *uti rogas*, "be it as you desire," relating to the magistrate who proposed the question; and the last for *antiquo*, or "I forbid it."

It is remarkable, that though in the election of magistrates, and in the ratification of laws, the votes of that century, whose tables were equally divided, signified nothing: yet in trials of life and death, if the tablets *pro* and *con* were the same in number, the person was actually acquitted.

The division of people into tribes was an invention of Romulus, after he had admitted the Sabines into Rome; and though he constituted at that time only three, yet as the state increased in power, and the city in number of inhabitants, they rose by degrees to 35. For a long time after this institution, a tribe signified no more than such a space of ground with its inhabitants. But at last the matter was quite altered, and a tribe was no longer *pars urbis*, but *pars civitatis*; not a quarter of the city, but a company of citizens living where they pleased. This change was chiefly occasioned by the original difference between the tribes in point of honour: For Romulus having committed all sordid and mechanic arts to the care of strangers, slaves, and libertines; and reserved the more honest labour of agriculture to the freemen and citizens, who by this active course of life might be prepared for martial service; the *tribus rustice* were for this reason esteemed more honourable than the *tribus urbanae*. And now all persons being desirous of getting into the more creditable division; and there being several ways of accomplishing their wishes, as by adoption, by the power of censors, or the like; that rustic tribe which had the most worthy names in its roll, had the preference to all others, though of the same general denomination. Hence all of the same great family, bringing themselves by degrees into the same tribe, gave the name of their family to the tribe they honoured; whereas at first the generality of the tribes did not borrow their names from persons but from places.

The first assembly of the tribes we meet with is about the year of Rome 263, convened by Sp. Sici-nius, tribune of the commons, upon account of the trial of Coriolanus. Soon after, the tribunes of the commons were ordered to be elected here; and at last, all the inferior magistrates, and the collegiate priests.

The same comitia served for the enacting of laws re-

Comitialis
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Comma.

lating to war and peace, and all others proposed by the tribunes and plebeian officers, though they had not properly the name of *leges*, but *plebiscita*. They were generally conveyed by the tribunes of the commons; but the same privilege was allowed to all the chief magistrates. They were confined to no place; and therefore sometimes we find them held in the comitium; sometimes in the campus martius, and now and then in the capitol. The proceedings were in most respects answerable to those already described in the account of the other comitia, and therefore need not be insisted on. Only we may farther observe of the comitia in general, that when any candidate was found to have most tablets for a magistracy, he was declared to be *designatus* or elected by the president of the assembly; and this they termed *renunciari consul, prætor*, or the like; and that the last sort of the comitia only could be held without the consent and approbation of the senate, which was necessary to the convening of the other two.

COMITIALIS MORBUS, an appellation given to the EPILEPSY, by reason the comitia of ancient Rome were dissolved if any person in the assembly happened to be taken with this distemper.

COMITIUM, in Roman antiquity, a large hall in the forum, where the COMITIA were ordinarily held.

COMMA, among grammarians, a point or character marked thus (,), serving to denote a short stop, and to divide the members of a period. Different authors define and use it differently. According to F. Buffier, the comma serves to distinguish the members of a period, in each of which is a verb and the nominative case of the verb: thus, "That so many people are pleased with trifles, is owing to a weakness of mind, which makes them love things easy to be comprehended." Besides this, the comma is used to distinguish, in the same member of a period, several nouns-substantive, or nouns-adjective, or verbs not united by a conjunction: thus, "Virtue, wit, knowledge, are the chief advantages of a man:" or, "A man never becomes learned without studying constantly, methodically, with a gust, application," &c. If those words are united in the same phrase with a conjunction, the comma is omitted: thus, "the imagination and the judgment do not always agree."

The ingenious author of the tract *De ratione interpungendi*, printed with Vossius's *Element. Rhetor.* Lond. 1724, lays down the use of a comma to be, to distinguish the simple members of a period or sentence; *i. e.* such as only consist of one subject, and one definite verb. But this rule does not go throughout; the same author instancing many particular cases not yet included herein, where yet the comma is advisable. See PUNCTUATION.

It is a general rule that a comma ought not to come between a nominative and a verb, or an adjective and substantive, when these are not otherwise disjoined: thus, in the sentence, *God ruleth with infinite wisdom*, a comma between *God* and *ruleth*, or between *infinite* and *wisdom*, would be absurd. But to this exceptions may occur; as when not a single word, but a sentence, happens to be the nominative: thus, in the example first above given, where the sentence *that so many people are pleased with trifles*, forms the nominative to the verb *is*, a comma at *trifles* is proper, both for the sake

of perspicuity, and as coinciding with a slight natural pause.

COMMA, in music. See INTERVAL.

COMMANDINUS (Frederic), born at Urbino in Italy, and descended from a very noble family, in the 16th century. To a vast skill in the mathematics, he had added a great knowledge in the Greek tongue, by which he was well qualified to translate the Greek mathematicians into Latin: accordingly he translated and published several, which no writer till then had attempted; as Archimedes, Apollonius, Euclid, &c.

COMMANDRY, a kind of benefice or fixed revenue belonging to a military order, and conferred on ancient knights who had done considerable services to the order.

There are strict or regular commandries, obtained in order, and by merit; there are others of grace and favour, conferred at the pleasure of the grand master; there are also commandries for the religious, in the orders of St Bernard and St Anthony. The kings of France have converted several of the hospitals for lepers into commandries of the order of St Lazarus.

The commandries of Malta are of different kinds; for as the order consists of knights, chaplains, and brothers-servitors, there are peculiar commandries or revenues attached to each. The knight to whom one of these benefices or commandries is given is called *commander*: which agrees pretty nearly with the præpositus set over the monks in places at a distance from the monastery, whose administration was called *obedientia*; because depending entirely upon the abbot who gave him his commission. Thus it is with the simple commanders of Malta, who are rather farmers of the order than beneficiaries; paying a certain tribute or rent, called *responsio*, to the common treasure of the order.

COMMELINA, in botany: A genus of the monogynia order, belonging to the triandria class of plants; and in the natural method ranking under the 6th order, *Ensatæ*. The corolla is hexapetalous; there are three nectaria, of a cruciform figure, and inserted into their proper filaments. There are ten species, all of them natives of warm climates. They are herbaceous plants, rising from two to four feet high, and adorned with blue or yellow flowers. Their culture differs in nothing from that of the common exotics.

COMMEMORATION, in a general sense, the remembrance of any person or thing, or the doing any thing to the honour of a person's memory, or in remembrance of any past event. Thus, the eucharist is a commemoration of the sufferings of Jesus Christ.

COMMENDAM, in the ecclesiastical law, the trust or administration of the revenues of a benefice, given either to a layman, to hold by way of depositum for six months, in order to repairs, &c. or to an ecclesiastic or beneficed person, to perform the pastoral duties thereof, till once the benefice is provided with a regular incumbent.

Anciently the administration of vacant bishoprics belonged to the nearest neighbouring bishop; which is still practised between the archbishopric of Lyons and the bishopric of Autun: on this account they were called *commendatory bishops*.

This custom appears to be very ancient. S. Athanasius

Comman-
dinus
||
Commen-
dam.

Commendam,
Commendatus.

nafius says of himself, according to Nicephorus, that there had been given him *in commendam*, i. e. in administration, another church besides that of Alexandria whereof he was stated bishop.

The care of churches, it seems, which had no pastor, was committed to a bishop, till they were provided of an ordinary: the register of Pope Gregory I. is full of these commissions, or commendams, granted during the absence or sickness of a bishop, or the vacancy of the see.

Some say, that Pope Leo IV. first set the modern commendams on foot, in favour of ecclesiastics who had been expelled their benefices by the Saracens; to whom the administration of the vacant churches was committed for a time, in expectation of their being restored: though S. Gregory is said to have used the same, while the Lombards desolated Italy.

In a little time the practice of commendams was exceedingly abused; and the revenues of monasteries given to laymen for their subsistence. The bishops also procured several benefices, or even bishoprics, *in commendam*, which served as a pretext for holding them all without directly violating the canons. Part of the abuse has been retrenched; but the use of commendams is still retained as an expedient to take off the incompatibility of the person by the nature of the benefice.

When a parson is made bishop, his parsonage becomes vacant; but if the king give him power, he may still hold it *in commendam*.

COMMENDATUS, one who lives under the protection of a great man. *Commendati homines*, were persons who, by voluntary homage, put themselves under the protection of any superior lord: for ancient homage was either *predial*, due for some tenure; or *personal*, which was by compulsion, as a sign of neces-

sary subjection; or voluntary, with a desire of protection; and those who, by voluntary homage, put themselves under the protection of any man of power, were sometimes called *homines ejus commendati*, as often occurs in Doomsday. *Commendati dimidii* were those who depended on two several lords, and paid one half of their homage to each; and *sub-commendati* were like under-tenants under the command of persons that were themselves under the command of some superior lord: also there were *dimidii sub-commendati*, who bore a double relation to such depending lords. This phrase seems to be still in use in the usual compliment, "Commend me to such a friend," &c. which is to let him know, "I am his humble servant."

COMMENSURABLE, among geometricians, an appellation given to such quantities as are measured by one and the same common measure.

COMMENSURABLE Numbers, whether integers or fractions, are such as can be measured or divided by some other number without any remainder: such are 12 and 18, as being measured by 6 and 3.

COMMENSURABLE in Power, is said of right lines, when their squares are measured by one and the same space or superficies.

COMMENSURABLE Surds, those that being reduced to their least terms, become true figurative quantities of their kind; and are therefore as a rational quantity to a rational one.

COMMENTARY, or COMMENT, in matters of literature, an illustration of the difficult or obscure passages of an author.

COMMENTARY, or *Commentaries*, likewise denotes a kind of history, or memoirs of certain transactions, wherein the author had a considerable hand: such are the Commentaries of Cæsar.

Commensurable
||
Commentary.

C O M M E R C E

IS an operation by which the wealth, or work, either of individuals or of societies, may be exchanged by a set of men called *merchants*, for an equivalent, proper for supplying every want, without any interruption to industry, or any check upon consumption.

CHAP. I. HISTORY of COMMERCE.

§ 1. General History.

It is a point as yet undecided by the learned, to what nation the invention and first use of commerce belonged; some attribute it to one people, some to another, for reasons that are too long to be discussed here. But it seems most probable that the inhabitants of Arabia were those that first made long voyages. It must be allowed, that no country was so happily seated for this purpose as that which they inhabited, being a peninsula washed on three sides by three famous seas, the Arabian, Indian, and Persian. It is also certain, that it was very early inhabited; and the first notice we have of any considerable trade refers it to the Ishmaelites, who were settled in the hither part of Arabia. To them Joseph was sold by his brethren, when they were going down with their ca-

mels to Egypt, with spicery, balm, and myrrh. It may seem strange to infer from hence, that commerce was already practised by this nation, since mention is here made of camels, or a caravan, which certainly implies an inland trade; and it must be likewise allowed, that balm and myrrh were the commodities of their country. But whence had they the spicery? Or how came Arabia to be so famous in ancient times for spices? Or whence proceeded that mistake of many great authors of antiquity, that spices actually grew there? Most certainly, because these people dealt in them; and that they dealt in them the first of any nation that we know of, appears from this very instance. Strabo and many other good authors assure us, that in succeeding times they were very great traders; they tell us particularly what ports they had; what prodigious magazines they kept of the richest kinds of goods, what wonderful wealth they obtained; in what prodigious magnificence they lived, and into what excesses they fell in respect to their expences for carving, building, and statues. All this shows that they were very great traders: and it also shows, that they traded to the East Indies; for from thence only they could have their spices, their rich gums, their sweet-scented woods, and their ivory, all which it is

expressly said that they had in the greatest abundance. This therefore proves, that they had an extensive and flourishing commerce; and that they had it earlier than any other nation, seems evident from their dealing at that time in spices. Besides, there is much less difficulty in supposing that they first discovered the route to the Indies, than if we ascribe that discovery to any other nation: for in the first place they lay nearest, and in the next they lay most conveniently; to which we may add, thirdly, that as the situation of their country naturally inclined them to navigation, so by the help of the monsoons they might make regular voyages to and from the Indies with great facility; nor is it at all unlikely that this discovery might be at first owing to chance, and to some of their vessels being blown by a strong gale to the opposite coast, from whence they might take the courage to return, by observing the regularity of the winds at certain seasons. All these reasons taken together seem to favour this opinion, that commerce flourished first among them; and as to its consequences in making them rich and happy, there is no dispute about them.

We find in the records of antiquity no nation celebrated more early for carrying all arts to perfection than the inhabitants of Egypt; and it is certain also, that no art was there cultivated more early, with more assiduity, or with greater success, than trade. It appears from the foregoing instance, that the richest commodities were carried there by land; and it is no less certain, that the most valuable manufactures were invented and brought to perfection there many ages before they were thought of in other countries: for, as the learned Dr Warburton very justly observes, at the time that Joseph came into Egypt, the people were not only possessed of all the conveniences of life, but were remarkable also for their magnificence, their politeness, and even for their luxury; which argues, that traffic had been of long standing amongst them. To say the truth, the great advantages derived from their country's lying along the Red Sea, and the many benefits that accrued to them from the Nile, which they very emphatically called *The River*, or *The River of Egypt*, and of which they knew how to make all the uses that can be imagined, gave them an opportunity of carrying their inland trade not only to a greater height than in any country at that time, but even higher than it has been carried any where, China only excepted; and some people have thought it no trivial argument to prove the descent of the Chinese from the Egyptians, that they have exactly the same sort of genius, and with wonderful industry and care have drawn so many cuts and canals, that their country is almost in every part of it navigable. It was by such methods, by a wise and well-regulated government, and by promoting a spirit of industry amongst the people, that the ancient Egyptians became so numerous, so rich, so powerful; and that their country, for large cities, magnificent structures, and perpetual abundance, became the glory and wonder of the old world.

The Phœnicians, though they possessed only a narrow slip of the coast of Asia, and were surrounded by nations so powerful and so warlike that they were never able to extend themselves on that side, became famous, by erecting the first naval power that makes

any figure in history, and for the raising of which they took the most prudent and effectual measures. In order to this, they not only availed themselves of all the creeks, harbours, and ports, which nature had bestowed very liberally on their narrow territory, but improved them in such a manner, that they were no less remarkable for their strength than considerable for their convenience; and so attentive they were to whatever might contribute to the increase of their power, that they were not more admired for the vast advantages they derived from their commerce, than they were formidable by their fleets and armies. They were likewise celebrated by antiquity as the inventors of arithmetic and astronomy; and in the last mentioned science they must have been very considerable proficient, since they had the courage to undertake long voyages at a time when no other nation (the Arabians and Egyptians excepted) durst venture farther than their own coasts. By these arts Tyre and Sidon became the most famous marts in the universe, and were resorted to by all their neighbours, and even by people at a considerable distance, as the great storehouses of the world. We learn from the Scriptures how advantageous their friendship and alliance became to the two great kings of Israel, David and Solomon; and we see, by the application of the latter for architects and artists to Hiram king of Tyre, to what a prodigious height they had carried manufactures of every kind.

It is very certain that Solomon made use of their assistance in equipping his fleets at Elath and Eziongeber; and it is very probable that they put him upon acquiring those ports, and gave him the first hints of the amazing advantages that might be derived from the possession of them, and from the commerce he might from thence be able to carry on. These ports were most commodiously situated on the Arabian gulph; and from thence his vessels, manned chiefly by Phœnicians, sailed to Ophir and Tharsis, where-ever those places were. Some writers will needs have them to be Mexico and Peru, which is certainly a wild and extravagant supposition; others believe that we are to look for Ophir on the coast of Africa, and Tharsis in Spain; but the most probable opinion is, that they were both seated in the East Indies. By this adventurous navigation he brought into his country curiosities not only unseen, but unheard of before, and riches in such abundance, that, as the Scripture finely expresses it, "He made silver in Jerusalem as stones, and cedar-trees as sycamores that grow in the plains." The metaphor is very bold and emphatical; but when we consider that it is recorded in this History, that the return of one voyage only to Ophir produced 450 talents of gold, which makes 51,328 pounds of our Troy weight, we cannot doubt of the immense profit that accrued from this commerce. It is also observable that the queen of Sheba, or Saba, which lies in that part of Arabia before mentioned, surprised at the reports that were spread of the magnificence of this prince, made a journey to his court on purpose to satisfy herself, whether fame had not exaggerated the fact; and from the presents she made him of 120 talents of gold, of spices in great abundance, and precious stones, we may discern the true reason of her curiosity, which proceeded from an opi-

nion that no country could be so rich as her own. And there is another circumstance very remarkable, and which seems strongly to fortify what we have advanced in the beginning of this section; it is added, "neither were there any such spices as the queen of Sheba gave to King Solomon;" which seems to intimate, that the Arabians had penetrated farther into the Indies than even the fleets of this famous prince, and brought from thence other spices (perhaps nutmegs and cloves) than had ever been seen before. It was by his wisdom, and by his steady application to the arts of peace, all of which mutually support each other, as they are all driven on by the wheel of commerce, which supplies every want, and converts every superfluity into merchandize, that this monarch raised his subjects to a condition much superior to that of any of their neighbours, and rendered the land of Israel, while he governed it, the glory and wonder of the East. He made great acquisitions without making wars; and his successor, by making wars, lost those acquisitions. It was his policy to keep all his people employed; and, by employing them, he provided equally for the extension of their happiness, and his own power: but the following kings pursued other measures, and other consequences attended them. The trade of Judæa sunk almost as suddenly as it rose, and in process of time they lost those ports on the Red Sea, upon which their Indian commerce depended.

The whole trade of the universe became then, as it were, the patrimony of the Phœnicians and the Egyptians. The latter monopolized that of the Indies, and, together with her corn and manufactures, brought such a prodigious balance of wealth continually into the country, as enabled the ancient monarchs of Egypt to compass all those memorable works that in spite of time and barbarous conquerors remain the monuments of their wisdom and power, and are like to remain so as long as the world subsists. The Phœnicians drew from Egypt a great part of those rich commodities and valuable manufactures which they exported into all the countries between their own and the Mediterranean sea; they drew likewise a vast resort to their own cities, even from countries at a great distance; and we need only look into the prophets Isaiah and Ezekiel in order to be convinced that these governments, founded on trade, were infinitely more glorious and more stable than those that were erected by force. All this we find likewise confirmed by profane histories; and by comparing these, it is evident, that the industry of the inhabitants of this small country triumphed over all obstacles, procured the greatest plenty in a barren soil, and immense riches, where, without industry, there must have been the greatest indigence. It is true, that old Tyre was destroyed by Nebuchadnezzar, but not till she had flourished for ages; and even then she fell with dignity, and after a resistance that ruined the army of the Great Conqueror of Asia. Out of the ashes of this proud city the great spirit of its inhabitants produced a Phœnix, little, if at all, inferior in beauty to its parent. New Tyre was situated on an island; and though her bounds were very narrow, yet she became quickly the mistress of the sea, and held that supreme dominion till subdued by Alexander the Great, whom

no power could resist. The struggle she made, however, though unsuccessful, was great, and very much to the honour of her inhabitants: it must be owned, that the Greek hero found it more difficult to master this single place, than to overcome the whole power of Persia.

The views of the Macedonian prince were beyond comparison more extensive than his conquests; and whoever considers Alexander's plan of power, and enters into it thoroughly, will think him more a politician than he was a conqueror. He framed in his own mind an idea of universal monarchy, which it was indeed impossible to accomplish; but the very notion of it does him far greater honour than all his victories. He thought of placing his capital in Arabia; and of disposing things in such a manner, as to have commanded the most remote parts of the Indies, at the same time that he maintained a connection with the most distant countries in Europe. He was for making use of force to acquire, but he very well knew that commerce only could preserve, an empire, that was to have no other limits than those which nature had assigned the world. He desired to be master of all; but at the same time he was willing to be a wise and gracious master, and to place his happiness in that of his people, or rather in making all the nations of the earth but one people. A vast, an extravagant, an impracticable scheme it was, of which he lived not long enough to draw the outlines; but the sample he left in his new city of Alexandria sufficiently shows how just and how correct his notions were, and how true a judgment he had formed of what might be effected by those methods upon which he depended. That city, which he might be said to design with his own hand, and which was built, as it were, under his eye, became in succeeding times all that he expected, the glory of Egypt, and the centre of commerce for several ages.

While Tyre was in the height of her glory, and had no rival in the empire of the sea, she founded her noble colony of Carthage on the coast of Africa. The situation of the city was every where admirable; whether considered in the light of a capital, of a strong fortress, or of a commodious port. It was equally distant from all the extremities of the Mediterranean sea, had a very fine country behind it, and was not in the neighbourhood of any power capable of restraining its commerce or its growth. It is almost inexpressible how soon its inhabitants became not only numerous and wealthy, but potent and formidable. By degrees they extended themselves on all sides, conquered the best part of Spain, and erected there a new Carthage; the islands of Sicily and Sardinia, or at least the best part of them, submitted likewise to their yoke. Their conquests, however, were inconsiderable in extent, when compared with their navigation. On one side they stretched as far westward as Britain; and the Scilly islands, which are now so inconsiderable, were to them as Indies, the route to which they used the utmost industry to conceal. On the other hand, they discovered a great part of the coast of Africa, the Canary islands; and some there are who believe they first found the way to America. While they confined themselves to trade, and the arts which belonged thereto, their power was continually increasing;

sing; but when industry gave way to luxury, and a spirit of ambition banished their old maxims of frugality and labour, their acquisitions remained at a stand. The Romans began to grow jealous of their naval power, which it cost them two obstinate wars of 40 years continuance to humble. When she was at length destroyed, her very ruins were majestic; for at the beginning of the third fatal Punic war, this city contained 700,000 inhabitants alone, and had 300 cities in Africa under her dominion. Such was the empire of Carthage, raised entirely by commerce; and to which, if she had been content to have applied herself with the same steadiness in her highest prosperity as in her early beginnings, there is no doubt she had preserved her freedom much longer than she did; for as thrift, and diligence, and good faith, are the pillars of a commercial state; so when these are once shaken, it is not only natural that she should decline, but unavoidable also.

The Ptolemies, who were the successors of Alexander in Egypt, entered deeply into that hero's scheme, and reaped the benefit of his wise establishment. Ptolemy Philadelphus, by encouraging trade, made his subjects immensely rich, and himself inexpressibly powerful. We are told by an ancient author, that he had 120 galleys of war of an enormous size, and upwards of 4000 other vessels, small and great. This would appear incredible, if other wonders were not related of him, which seem to explain and confirm these. He raised a new city on the coast of the Red Sea; he was at an immense expence in opening harbours, constructing quays, in raising inns at proper distances on the road, and in cutting a canal from sea to sea. A prince who comprehended the importance of commerce to a degree that induced him to dare such expences as these, might have what treasures, what armies, what fleets he pleased. In his time, Alexandria appeared in pomp and splendor. She owed her birth to Alexander; but it was Ptolemy, who caught a double portion of his master's spirit, which raised her to that magnificence that ages could not deface. We may guess at what she was in her glory, by what we are told was the produce of her customs, which fell little short of two millions of our money annually; and yet we cannot suppose that Ptolemy, who understood trade so well, would cramp it by high duties, or extravagant impositions. When the revenue of the prince from a single port was so great, what must have been the riches of his subjects!

But what shows us Alexandria in the highest point of light, is the credit she maintained after Egypt sunk from an empire into a province. The Romans themselves were struck with the majesty of her appearance; and though till then they had little regarded traffic, yet they were not long before they comprehended the advantages of such a port, and such a mart as Alexandria; they confirmed her privileges, they protected her inhabitants, they took every measure possible to preserve her commerce; and this with so good an effect, that she actually preserved it longer than Rome herself could preserve her power. She followed, indeed, the fortune of the empire; and became at last dependent upon Constantinople, when its founder removed thither the capital of the empire; and his

successor found means to transfer also a part of the trade of Alexandria to the same place. Yet this city continued still to hold up her head, and though she sunk under the barbarous power of the Arabs, yet they grew polished by degrees; by degrees she recovered somewhat of her ancient pre-eminence; and though she never rose to any thing like her former lustre, yet she remained the centre of what little trade there was in the world; which is more than can be said of almost any place that has fallen under the Mohammedan power.

When the Roman empire was over-run by barbarians, and arts and sciences sunk with that power which had cultivated and protected them, commerce also visibly declined; or, to speak with greater propriety, was overwhelmed and lost. When that irruption of various nations had driven the Roman policy out of the greatest part of Europe, some straggling people, either forced by necessity, or led by inclination, took shelter in a few straggling islands that lay near the coast of Italy, and which would never have been thought worth inhabiting in a time of peace. This was in the 6th century; and at their first fixing there they had certainly nothing more in view than living in a tolerable state of freedom, and acquiring a subsistence as well as they could. These islands being divided from each other by narrow channels, and those channels so encumbered by shallows that it was impossible for strangers to navigate them, these refugees found themselves tolerably safe; and uniting amongst themselves for the sake of improving their condition, and augmenting their security, they became in the 8th century a well-settled government, and assumed the form of a republic.

Simple and mean as this relation may appear, yet it is a plain and true account of the rise, progress, and establishment of the famous and potent republic of Venice. Her beginnings were indeed weak and slow; but when the foundation was once well laid, her growth was quick, and the increase of her power amazing. She extended her commerce on all sides; and taking advantage of the barbarous maxims of the Mohammedan monarchies, she drew to herself the profits of the Indian trade, and might, in some sense, be said to make Egypt a province, and the Saracens her subjects. By this means her traffic swelled beyond conception; she became the common mart of all nations; her naval power arrived at a prodigious height; and, making use of every favourable conjecture, she stretched her conquest not only over the adjacent Terra Firma of Italy, but through the islands of the Archipelago, so as to be at once mistress of the sea, of many fair and fruitful countries, and of part of the great city of Constantinople itself. But ambition, and the desire of lording it over her neighbours, brought upon her those evils which first produced a decay of trade, and then a declension of power. General histories indeed ascribe this to the league of Cambray, when all the great powers in Europe combined against this republic; and in truth, from that period the sinking of her power is truly dated; but the Venetian writers very justly observe, that though this effect followed the league, yet there was another more latent, but at the same time a more effectual cause, which was, the falling off of their commerce; and they

they have ever since been more indebted to their wisdom than their power; to the prudent concealing of their own weakness, and taking advantage of the errors of their enemies, than to any other cause, for their keeping up that part which they still bear, and which had been lost long ago by any other nation but themselves.

At the same time that Venice rose, as it were, out of the sea, another republic was erected on the coast of Italy. There could not well be a worse situation than the narrow, marshy, unprofitable, and unwholesome islands in the Adriatic, except the rocky, barren, and inhospitable shores of Liguria; and yet as commerce raised Venice the Rich on the one, so she erected Genoa the Proud on the other. In spite of ambitious and warlike neighbours, in spite of a confined and unproducing country, and, which were still greater impediments, in spite of perpetual factions and successive revolutions, the trade of Genoa made her rich and great. Her merchants traded to all countries, and thrived by carrying the commodities of the one to the other. Her fleets became formidable; and, besides the adjacent island of Corsica, she made larger and important conquests. She fixed a colony at Caffa, and was for some time in possession of the coasts on both sides of the Black Sea. That emulation which is natural to neighbouring nations, and that jealousy which rises from the pursuit of the same mistress, commerce, begat continual wars between these rival republics; which, after many obstinate and bloody battles, were at last terminated in favour of Venice, by that famous victory of Chiozza gained by her doge Andrew Contarini, from which time Genoa never pretended to be mistress of the sea. These quarrels were fatal to both; but what proved more immediately destructive to the Genoese, was their avarice, which induced them to abandon the fair profits of trade for the sake of that vile method of acquiring wealth by usury.

But we must now look to another part of the world. In the middle age of the German empire, that is about the middle of the 13th century, there was formed a confederacy of many maritime cities, or at least of cities not far from the sea. This confederacy solely regarded commerce, which they endeavoured to promote and extend, by interesting therein a great number of persons, and endeavouring to profit by their different views and different lights. Though the cities of Germany held the principal rank in the Teutonic Hanse, they did not however forbear associating many other cities, as well in France as in England and in the low countries; the whole, however, without hurting the authority, without prejudice to the rights, of the sovereign on whom they depended. This confederacy had its laws, its ordinances, and its judgments, which were observed with the same respect as the maritime code of the Rhodians, who passing for the ablest seamen in all antiquity, their constitutions were observed by the Greeks and Romans. The Teutonic Hanse grew in a short time to so high a rank in power and authority by the immense riches it acquired, that princes themselves rendered it a sincere homage from principles of esteem and admiration. Those of the north principally had frequent occasion for their credit, and borrowed of them considerable sums. The

grand masters of the Teutonic order, who were at that time sovereigns of Livonia, declared themselves conservators of the rights and privileges of the Hanse: all succeeded not only to, but beyond their wishes; and Germany, charmed with their progress, looked on them with the same eyes as a curious gardener does on certain rare plants, though not of his own raising and culture. The kings of France and England granted also various privileges to the Teutonic confederacy; they exempted their vessels in case of shipwreck from all demands whatsoever from the admiralty, or from private persons; they forbade any disturbance to their navigation at all times, and even when France was at war with the emperor, or the princes of the north. In fine, during the course of those unhappy wars which were styled *Croisades*, the Hanse was signally consulted, and gave always puissant succours in money and in ships to the Christians oppressed by infidels. It is astonishing, that cities at so great a distance from each other, subject to different kings, sometimes in open war, but always jealous of their rights, should be able to confederate and live together in so strict an union. But when this union had rendered them very rich and powerful, it cannot seem at all strange, that on the one hand they grew arrogant and overbearing, took upon them not only to treat with sovereigns on the foot of equality, but even to make war with them, and more than once with success. It will, on the other hand, appear still less strange, that such behaviour as this awakened various princes to a more particular view of the dangers that such a league might produce, and the advantages that would naturally flow to their respective states, by recovering their trade thus made over, at least in some part to others, entirely to themselves; and these, in few words, were the causes of the gradual declension of the Hanseatic alliance: which, however, is not totally dissolved at this day; the cities of Lubeck, Hamburg, and Bremen, maintaining sufficient marks of that splendor and dignity with which this confederacy was once adorned.

We must now turn our eyes to Portugal and Spain, where in the space of about 50 years there happened a train of events which gradually led on to such discoveries as changed the whole face of affairs in the commercial world, and gave to the knowledge of later ages what for some thousand years had been kept secret from all mankind, we mean a perfect and distinct notion of that terraqueous globe which they inhabit. The Kingdom of Portugal was small, but well cultivated, very populous, and blessed with a variety of good ports: all which, however, had stood them in little stead, if they had not had a succession of wise princes, who, instead of involving themselves in war with their neighbours to gratify their ambition, endeavoured to extend the happiness and wealth of their subjects, and by so doing their own power, in the softer and more successful method of protecting arts and sciences, encouraging industry, and favouring trade. This, with the convenient situation of their country, in the beginning of the 15th century, prompted some lively spirits to attempt discoveries; and these, countenanced by an heroic young prince, pushed on their endeavours with such success, that step by step the coast of Africa was surveyed as far as the Cape of Good Hope, to which they

they gave that name. The point they had in view was a new route to the East Indies, which Vasquez de Gama happily discovered; and in a short space of time, Portugal, from one of the least considerable, grew to be one of the richest powers in Europe, gained prodigious dominions in Asia and Africa, and raised a naval power superior to any thing that had been seen for many ages before.

See Colum-
bus (Christo-
pher).

But while this was doing, Christopher Columbus, a Genoese of great capacity, though of almost unknown original, who had been bred to the sea from his youth, and who had carefully studied what others made a trade, formed in his mind the amazing project of counteracting experience, and sailing to the Indies by a west course. He offered this project to the Portuguese, by whom it was considered and rejected as a chimera. He proposed it afterwards to other states, but with no better fortune; and at last owed the discovery of the New World to the high spirit of a heroine, the famous Isabella queen of Castile, who almost at her own expence; and with very little countenance from her husband, who yet was styled *Ferdinand and the Wife*, furnished the adventurous Columbus with that poor squadron, with which at once, in spite of all the difficulties that the envy of his officers, and the obstinacy of his mutinous crew, threw in his way, he perfected his design, and laid open a new Indies, though in reality he aimed at the discovery of the old. Neither was this noble effort of his matchless understanding defeated; for after his decease, Ferdinand Magellan, a Portuguese, proposed to the emperor Charles V. the discovery of a passage to the spice islands by the South Seas, which was what Columbus aimed at; and though Magellan lived not to return, yet in one voyage the discovery was perfected. It is inconceivable almost how many and how great benefits accrued to Europe from these discoveries; of which, however, it is certain, that the Portuguese made a very indifferent, and the Spaniards much worse, use; the former making slaves of, and the latter rooting out, the natives. This, as it was a most ungrateful return to divine Providence for so high a blessing; so it might have been easily foreseen it would prove, as experience has shown it did prove, highly prejudicial to their own interests, by depopulating very fine countries, which have been thereby turned into desarts: and though on their first discovery infinite treasures were returned from them, which were coined in the mints of Spain; yet by an obstinate pursuit of this false policy, the Spanish islands in the West Indies are now brought so low as to be scarce worth keeping. The consequences that naturally followed on the discovery of a passage by the Cape of Good Hope, and of a fourth part of the globe in the western hemisphere, were, as it has been already hinted, the cause of an entire change in the state of Europe, and produced, not only in Portugal and Spain, but in most other nations, a desire of visiting these remote parts, of establishing colonies, of setting manufactures on foot, of exporting and importing commodities, and of raising, settling, and protecting new manufactures. By this means, as the reader cannot but perceive, not only particular nations brought about signal advantages to themselves, but Europe in general received a lasting

and invaluable benefit: for its potentates made themselves formidable, and even terrible, in those distant parts of the earth, where their fame had hardly reached before. It is however true, that this has not been carried on as high as it might have been; for though there was room enough for every nation to have had its share, and though it might be demonstrated that the good of the whole would have contributed sufficiently to the profit of every state, the subjects of which had engaged in this traffic; yet, instead of prosecuting so natural and so equitable a measure, they have taken a quite contrary course; and by decrying, attacking, and destroying each other, have very much lessened that prodigious reverence which the Asiatics, Africans, and Americans, at first had for the inhabitants of Europe.

The naval power of the Portuguese received an incurable wound by falling under the power of the Spaniards: and though human policy would have suggested, that this alone must have raised the latter to the monopoly of commerce, and the universal dominion of the sea; yet the very pursuit of a design so visibly detrimental to the interest of mankind, proved very quickly their ruin also. For the Spaniards, from the natural haughtiness of their temper, misled by the boundless ambition of their princes, and endeavouring to become the lords of Europe, forced other nations in their own defence to make a much quicker progress in navigation than otherwise they could have done. For the English and Dutch, who till this time seemed blind to the advantages of their situation, had their eyes opened by the injuries they received; and by degrees the passion of revenge inspired them with designs that possibly public spirit had never excited. In short, the pains taken by Spain to keep all the riches that flowed from these discoveries to herself, and the dangerous, detestable, and destructive purposes to which she applied the immense wealth that flowed in upon her from them, produced effects directly opposite to those which she proposed, and made her enemies rich, great, powerful, and happy, in proportion as her commerce dwindled away, and as her naval power sunk and crumbled to pieces, merely by an improper display, an ill-managed exertion, and a wrong application of it.

It was from hence that the inhabitants of the Seven Provinces, whom her oppression had made poor, and her severities driven mad, became first free, then potent, and by degrees rich. Their distresses taught them the necessity of establishing a moderate and equal government; the mildness of that government, and the blessings which it procured to its subjects, raised their number, and elevated their hopes. The consequences became quickly visible, and in a short space of time amazing both to friends and enemies; every fishing village improved into a trading-town; their little towns grew up into large and magnificent cities; their inland boroughs were filled with manufactures; and in less than half a century the distressed States of Holland became high and mighty; nay, in spite of the danger and expences which attended a war made all that time against a superior force, these people, surrounded with enemies, loaded with taxes, exposed to personal service, and to a thousand other disadvantages, grew up to such a strength as not only made

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the Spaniards despair of reducing them any more under their dominion, but inclined them to wish, and at last forced them to seek, their friendship.

This, at least as far as either ancient or modern histories inform us, was the quickest and strongest of all the productions of commerce that the world has ever seen. For it is out of dispute, that the republic of the United Provinces owes her freedom, her power, and her wealth, to industry and trade entirely. The greatest part of the country is far from being fertile; and what is so, produces not enough to suffice the tenth part of its inhabitants for the tenth part of the year: the climate is rather tolerable than wholesome; and its havens are rather advantageous from the difficulty of entering them, than from their commodiousness in any other respect. Native commodities they have few or none; timber and maritime stores are entirely wanting; their country cannot boast so much as of a coal-mine; and yet these provinces, upon which nature has bestowed so little, in consequence of an extensive trade, are enriched with all things. Their storehouses are full of corn, even when the harvest in corn-countries fails; there is no commodity, how bulky soever, or however scarce and hard to come at, which may not be had from their magazines. The shipping of Holland is prodigious; and to see the quantities of naval stores with which their yards and ports abound, astonishes those who are unacquainted with the vigour of that cause which produces this abundance. But above all, the populousness of this country is the greatest miracle. That men should resort to a Canaan, and desire to live in a land flowing with milk and honey, is nothing strange; but that they should make it their choice to force nature, to raise palaces, lay out gardens, dig canals, plant woods, and ransack all the quarters of the earth for fruit and flowers, to produce an artificial paradise in a dead plain, or upon an ungrateful heath in the midst of fogs and standing lakes, would in so critical an age as this pass for a fable, if the country did not lie so near us as to put the truth of it out of question.

§ 2. *British History.*

WE may easily conceive, that foreign commerce by the natives of this island must have been a work of time; for men think first of necessities, then of conveniences, and last of superfluities. Those who came originally from the continent might have better notions of things; but as it must be presumed that either fear or indigence drove them hither, so it is easy to apprehend that succeeding generations must for some time sink much below their ancestors in their notions of the commodities of life; and, deriving their manners from their circumstances, become quite another sort of people. But those on the opposite continent, knowing that this island was inhabited, and having the use, though in ever so imperfect a degree, of vessels, and of foreign traffic, came over hither, and bartered their goods for the raw commodities of the Britons, till by degrees perhaps they taught the latter to make some improvement in those slight leather and wicker boats, which they used for passing their own rivers, and creeping along their coasts, till at last they ventured themselves over to Gaul, and entered upon some kind of correspondence with their neighbours. All this is so deducible from the laws of

nature, that we might have divined thus much by the light of reason, if we had not the commentaries of Cæsar to guide us, and to strengthen by the authority of history the facts that might have been found out by the force of rational conjecture.

Things were precisely in this situation when the Romans invaded Britain; and there is no doubt that our ancestors falling under the power of that empire, and under its power at a time when with respect to arts and sciences it was in a most flourishing condition, was a great advantage to them; and though from their love of civil liberty, which, when under the direction of reason, is the most natural and laudable of all passions, they made a long and vigorous, and in some sense a noble and glorious, resistance; yet by degrees they caught the manners and customs of their conquerors, and grew content to be happy rather than free. With learning and politeness the Romans introduced foreign commerce; and according to the nature of their policy, as they made high roads through the island, established colonies in proper places, and fixed standing camps, which were a kind of fortresses, where they thought proper; so they were no less careful with regard to marts or emporiums for the conveniency of traders, and of which what they found was uncertain: but that they left many, is without question; and amongst the rest London, which is not more famous for her present extensive trade, than venerable for her unrecorded antiquity.

When the Romans unwillingly left Britain, and the Britons as unwillingly made way for the Saxons, a new deluge of barbarity overflowed this island: almost all the improvements of four civilized conquerors were defaced; and upon the establishment as it were of a new people, things were all to begin again. This necessarily took up a great deal of time; and before they were in any tolerable posture, the Saxons found themselves distressed by fresh swarms of barbarians. Yet there still remains some evidences of their having been acquainted with, inclined to, and, if their circumstances would have permitted, most certainly would have entered upon and carried foreign commerce to a great height. We have authentic testimonies, that Alfred the Great formed projects of vast discoveries to the North, as he actually sent persons of great prudence and abilities into the East; and the curiosities which they brought home were for many ages preserved in the treasury of the church of Salisbury.

As for the Danes, they were not long our masters: but as they became so by a maritime force, and as their countrymen had established themselves not only on the opposite shore of France, but in other parts of Europe; so it is reasonable to believe that they held some correspondence with them from hence; and that, if their dominion had lasted longer, this might have been better regulated, and productive of many advantages. But they had soon to do with their brethren in another way: for the Normans, men of the same race, but better established in another country, dispossessed them here; and partly under colour of right, partly by force, elected that monarchy, which, not without various alterations and changes, subsists even to our times, and to the subsistence of which, with the help of those changes and alterations, we owe that happy constitution under which we live; that universal improvement which adorns the face of

our country; that domestic trade which nourishes so numerous a people, by plentifully rewarding their industry; and that extensive commerce which is at once the source of our wealth and the support of our liberty.

It cannot be expected, that in a work like this we should attempt to trace the progress of trade through every reign, show how it was encouraged and protected, or discountenanced and checked; what occasions were luckily seized, or what opportunities unfortunately lost. It may be sufficient for us, after what has been already said, to observe, that the opinion commonly entertained, of our having little or no trade before the reign of queen Elizabeth, is very far from being well founded.

In fact, the reign of that princess was great and glorious, in whatever light we consider it; but it was most so in this, that, under Providence, it became great and glorious by the wisdom and prudence of the queen and her ministers. The English nation never was in so desperate a condition as at her accession. The crown was in debt, the treasury empty, the nation involved in a foreign war directly against her own interests, her coasts naked; in a word, without credit abroad, and without concord at home, no settled religion, the great men split into factions, and the common people distracted and dejected. Sad circumstances these! and yet from hence arose the grandeur of that reign, and the establishment of our commerce. The queen found herself obliged to act with great caution, to derive assistance from every quarter, to employ it faithfully, and to promote to the utmost of her power the welfare of her subjects, whom nothing but the public-spiritedness of her government could enable to grow rich enough to support the necessary expences of the crown. It was this gave a popular turn to her councils. She encouraged her subjects to arm against the Spaniards, that they might be accustomed to the sea, and acquire that knowledge in navigation, with which, till then, they had been unacquainted. She passed many laws for the public good, erected several companies, and saw that those companies pursued the ends for which they were erected; in short, she did every thing that could be expected, during the whole course of her reign, to excite and encourage industry at home, and to enable us to make a proper figure abroad. In a word, she furnished us with stock and credit, put us upon improving our commodities and manufactures, brought the art of ship-building amongst us, filled our ports with able seamen, showed a just respect to English merchants, reduced Ireland so as to render it beneficial to Britain, and approved our sending colonies into America; and thus the seeds of British wealth were sown in her time, though the harvest was reaped in the days of her successors. See the articles COALERY, COLONY, FISHERIES, MANUFACTURES, SHIPPING, and TRADE.

CHAP. II. PRINCIPLES of COMMERCE.

§ 1. *Origin of Trade.*

THE most simple of all trade is that which is carried on by bartering the necessary articles of subsistence. If we suppose the earth free to the first pos-

essor, this person who cultivates it will first draw from it his food, and the surplus will be the object of barter: he will give this in exchange to any one who will supply his other wants. This naturally supposes both a surplus quantity of food produced by labour, and also free hands; for he who makes a trade of agriculture cannot supply himself with all other necessaries, as well as food; and he who makes a trade of supplying the farmers with such necessaries, in exchange for his surplus of food, cannot be employed in producing that food. The more the necessities of man increase, the more free hands are required to supply them; and the more free hands are required, the more surplus food must be produced by additional labour, to supply their demand.

This is the least complex kind of trade, and may be carried on to a greater or less extent, in different countries, according to the different degrees of the wants to be supplied. In a country where there is no money, nor any thing equivalent to it, the wants of mankind will be confined to few objects; to wit, the removing the inconveniences of hunger, thirst, cold, heat, danger, and the like. A free man, who, by his industry, can procure all the comforts of a simple life, will enjoy his rest, and work no more: and, in general, all increase of work will cease, so soon as the demand for the purposes mentioned comes to be satisfied. There is a plain reason for this. When the free hands have procured, by their labour, where-withal to supply their wants, their ambition is satisfied: so soon as the husbandmen have produced the necessary surplus for relieving theirs, they work no more. Here then is a natural stop put to industry, consequently to bartering.

The next thing to be examined is, how bartering grows into trade, properly so called, and understood, according to the definition given of it above; how trade comes to be extended among men; how manufactures, more ornamental than useful, come to be established; and how men come to submit to labour, in order to acquire what is not absolutely necessary for them.

This, in a free society, is chiefly owing to the introduction of money, and a taste for superfluities in those who possess it.

In ancient times, money was not wanting; but the taste for superfluities not being in proportion to it, the specie was locked up. This was the case in Europe four hundred years ago. A new taste for superfluity has drawn, perhaps, more money into circulation, from our own treasures, than from the mines of the new world. The poor opinion we entertain of the riches of our forefathers, is founded upon the modern way of estimating wealth, by the quantity of coin in circulation, from which we conclude, that the greatest part of the specie now in our hands must have come from America.

It is more, therefore, through the taste of superfluity, than in consequence of the quantity of coin, that trade comes to be established; and it is only in consequence of trade that we see industry carry things in our days to so high a pitch of refinement and delicacy. Let us illustrate this, by comparing together the different operations of barter, sale, and commerce.

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When reciprocal wants are supplied by barter, there is not the smallest occasion for money: this is the most simple of all combinations.

When wants are multiplied, bartering becomes more difficult: upon this money is introduced. This is the common price of all things: it is a proper equivalent in the hands of those who want, perfectly calculated to supply the occasions of those who, by industry, can relieve them. This operation of buying and selling is a little more complex than the former; but still we have here no idea of trade, because we have not introduced the merchant, by whose industry it is carried on.

Let this third person be brought into play, and the whole operation becomes clear. What before we called *wants*, is here represented by the consumer; what we called *industry*, by the manufacturer; what we called *money*, by the merchant. The merchant here represents the money, by substituting credit in its place; and as the money was invented to facilitate barter, so the merchant, with his credit, is a new refinement upon the use of money. This renders it still more effectual in performing the operations of buying and selling. This operation is trade: it relieves both parties of the whole trouble of transportation, and adjusting wants to wants, or wants to money; the merchant represents by turns both the consumer, the manufacturer, and the money. To the consumer he appears as the whole body of manufacturers; to the manufacturers as the whole body of consumers; and to the one and the other class his credit supplies the use of money. This is sufficient at present for an illustration. We now return to the simple operations of money in the hands of the two contracting parties, the buyer and the seller, in order to show how men come to submit to labour in order to acquire superfluities.

So soon as money is introduced into a country, it becomes an universal object of want to all the inhabitants.

The consequence is, that the free hands of the state, who before stopt working, because all their wants were provided for, having this new object of ambition before their eyes, endeavour, by refinements upon their labour, to remove the smaller inconveniences which result from a simplicity of manners. People, who formerly knew but one sort of clothing for all seasons, willingly part with a little money to procure for themselves different sorts of apparel properly adapted to summer and winter, which the ingenuity of manufacturers, and their desire of getting money, may have suggested to their invention.

Indeed these refinements seem more generally owing to the industry and invention of the manufacturers (who by their ingenuity daily contrive means of softening or relieving inconveniences which mankind seldom perceive to be such, till the way of removing them is contrived), than to the taste of luxury in the rich, who, to indulge their ease, engage the poor to become industrious.

Let any man make an experiment of this nature upon himself, by entering into the first shop. He will no where so quickly discover his wants as there. Every thing he sees appears either necessary, or at least highly convenient; and he begins to wonder how he could

have been so long without that which the ingenuity of the workman alone had invented, in order that from the novelty it might excite his desire; for perhaps when it is bought, he will never once think of it more, nor ever apply it to the use for which it at first appeared so necessary.

Here then is a reason why mankind labour though not in want. They become desirous of possessing the very instruments of luxury, which their avarice or ambition prompted them to invent for the use of others.

What has been said represents trade in its infancy, or rather the materials with which that great fabric is built.

We have formed an idea of the wants of mankind multiplied even to luxury, and abundantly supplied by the employment of all the free hands set apart for that purpose. But if we suppose the workman himself disposing of his work, and purchasing with it food from the farmer, cloaths from the cloathier; and, in general, seeking for the supply of every want from the hands of the person directly employed for the purpose of relieving it; this will not convey an idea of trade according to our definition.

Trade and commerce are an abbreviation of this long process: a scheme invented and set on foot by merchants, from a principle of gain, supported and extended among men, from a principle of general utility to every individual, rich or poor; to every society, great or small.

Instead of a pin-maker exchanging his pins with 50 different persons, for whose labour he has occasion, he sells all to the merchant for money or for credit; and as occasion offers, he purchases all his wants, either directly from those who supply them, or from other merchants who deal with manufacturers in the same way his merchant dealt with him.

Another advantage of trade is, that industrious people in one part of the country, may supply customers in another, though distant. They may establish themselves in the most commodious places for their respective business, and help one another reciprocally, without making the distant parts of the country suffer for want of their labour. They are likewise exposed to no avocation from their work, by seeking for customers.

Trade produces many excellent advantages; it marks out to the manufacturers when their branch is under or overstocked with hands. If it is understocked, they will find more demand than they can answer; if it is overstocked, the sale will be slow.

Intelligent men, in every profession, will easily discover when these appearances are accidental, and when they proceed from the real principles of trade.

Posts, and correspondence by letters, are a consequence of trade; by the means of which merchants are regularly informed of every augmentation or diminution of industry in every branch, in every part of the country. From this knowledge they regulate the prices they offer; and as they are many, they serve as a check upon one another, from the principles of competition.

From the current prices, the manufacturers are as well informed, as if they kept the correspondence themselves: the statesman feels perfectly where hands

are wanting, and young people destined to industry, obey, in a manner, the call of the public, and fall naturally in to supply the demand.

Two great assistances to merchants, especially in the infancy of trade, are public markets for collecting the work of small dealers, and large undertakings in the manufacturing way by private hands. By these means the merchants come at the knowledge of the quantity of work in the market, as on the other hand the manufacturers learn, by the sale of the goods, the extent of the demand for them. These two things being justly known, the price of goods is easily fixed.

Public sales serve to correct the small inconveniences which proceed from the operations of trade. A set of manufacturers got all together into one town, and entirely taken up with their industry, are thereby as well informed of the rate of the market as if every one of them carried thither his work; and upon the arrival of the merchant, who readily takes it off their hands, he has not the least advantage over them from his knowledge of the state of demand. This man both buys and sells in what is called *wholesale*; and from him retailers purchase, who distribute the goods to every consumer throughout the country. These last buy from wholesale merchants in every branch, that proportion of every kind of merchandize which is suitable to the demand of their borough, city, or province.

Thus all inconveniences are prevented, at some additional cost to the consumer, who must naturally reimburse the whole expence. The distance of the manufacturer, the obscurity of his dwelling, the caprice in selling his work, are quite removed; the retailer has all in his shop, and the public buys at a current price.

§ 2. *How the price of Goods are determined by Trade.*

IN the price of goods, two things must be considered as really existing, and quite different from one another; to wit, the real value of the commodity, and the profit upon alienation.

I. The first thing to be known of any manufacture, when it comes to be sold, is, how much of it a person can perform in a day, a week, a month, according to the nature of the work, which may require more or less time to bring it to perfection. In making such estimates, regard is to be had only to what, upon an average, a workman of the country in general may perform, without supposing him the best or the worst in his profession, or having any peculiar advantage or disadvantage as to the place where he works.

Hence the reason why some people thrive by their industry, and others not; why some manufactures flourish in one place and not in another.

II. The second thing to be known is, the value of the workman's subsistence, and necessary expence, both for supplying his personal wants and providing the instruments belonging to his profession, which must be taken upon an average as above; except when the nature of the work requires the presence of the workman in the place of consumption; for although some trades, and almost every manufacture, may be carried on in places at a distance, and therefore may fall under one general regulation as to prices; yet others there

are, which, by their nature, require the presence of the workman in the place of consumption; and in that case the prices must be regulated by circumstances relative to every particular place.

III. The third and last thing to be known, is the value of the materials, that is, the first matter employed by the workman; and if the object of his industry be the manufacture of another, the same process of inquiry must be gone through with regard to the first as with regard to the second: and thus the most complex manufactures may be at last reduced to the greatest simplicity.

These three articles being known, the price of manufacture is determined. It cannot be lower than the amount of all the three, that is, than the real value; whatever it is higher, is the manufacturer's profit. This will ever be in proportion to demand, and therefore will fluctuate according to circumstances.

Hence appears the necessity of a great demand, in order to promote flourishing manufactures.

By the extensive dealings of merchants, and their constant application to the study of the balance of work and demand, all the above circumstances are known to them, and are made known to the industrious, who regulate their living and expence according to their certain profit.

Employ a workman in a country where there is little trade or industry, he proportions his price always to the urgency of your want, or your capacity to pay; but seldom to his own labour. Employ another in a country of trade, he will not impose upon you, unless perhaps you be a stranger, which supposes your being ignorant of the value; but employ the same workman in a work not usual in the country, consequently not demanded, consequently not regulated as to the value, he will proportion his price as in the first supposition.

We may therefore conclude, from what has been said, that in a country where trade has been established, manufactures must flourish, from the ready sale, the regulated price of work, and the certain profit resulting from industry. Let us next inquire into the consequences of such a situation.

§ 3. *How foreign Trade opens to an industrious People, and the consequences of it to the Merchants who set it on foot.*

THE first consequence of the situation described in the preceding section is, that wants are easily supplied for the adequate value of the thing wanted.

The next consequence is, the opening of foreign trade, under its two denominations of passive and active. Strangers and people of distant countries, finding the difficulty of having their wants supplied at home, and the ease of having them supplied from this country, immediately have recourse to it. This is passive trade. The active is when merchants, who have executed this plan at home with success, begin to transport the labour of their countrymen into other regions, which either produce, or are capable of producing such articles of consumption, proper to be manufactured, as are most demanded at home; and consequently will meet with the readiest sale, and fetch the largest profits.

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Here then is the opening of foreign trade, under its two denominations of active and passive.

What then are the consequences of this new commerce to our merchants, who have left their homes in quest of gain abroad?

The first is, that, arriving in any new country, they find themselves in the same situation, with regard to the inhabitants, as the workmen in the country of no trade, with regard to those who employ him; that is, they proportion the price of their goods to the eagerness of acquiring, or the capacity of paying, in the inhabitants, but never to their real value.

The first profits then, upon this trade, must be very considerable; and the demand from such a country will be *high* or *low*, *great* or *small*, according to the spirit, not the real wants of the people: for these in all countries must first be supplied by the inhabitants themselves, before they cease to labour.

If the people of this not-trading country be abundantly furnished with commodities useful to the traders, they will easily part with them, at first, for the instruments of luxury and ease; but the great profit of the traders will insensibly increase the demand for the productions of their new correspondents: this will have the effect of producing a competition between themselves, and thereby throwing the demand on their side. This is perpetually a disadvantage in traffic; the most unpolished nations in the world quickly perceive the effects of it; and are taught to profit by the discovery, in spite of the address of those who are the most expert in commerce.

The traders will therefore be very fond of falling upon every method and contrivance to inspire this people with a taste of refinement and delicacy. Abundance of fine presents, consisting of every instrument of luxury and superfluity, the best adapted to the genius of the people, will be given to the prince and leading men among them. Workmen will even be employed at home, to study the taste of the strangers, and to captivate their desires by every possible means. The more eager they are of presents, the more lavish the traders will be in bestowing and diversifying them. It is an animal put up to fatten; the more he eats, the sooner he is fit for slaughter. When their taste for superfluity is fully formed, when the relish for their former simplicity is sophisticated, poisoned, and obliterated, then they are surely in the fetters of the traders, and the deeper they go, the less possibility there is of their getting out. The presents then will die away, having served their purpose: and if afterwards they are found to be continued, it will probably be to support the competition against other nations, who will incline to share of the profits.

If, on the contrary, this not-trading nation does not abound with commodities useful to the traders, these will make little account of trading with them, whatever their turn may be; but, if we suppose this country inhabited by a laborious people, who, having taken a taste for refinement from the traders, apply themselves to agriculture, in order to produce articles of subsistence, they will solicit the merchants to give them part of their manufactures in exchange for those; and this trade will undoubtedly have the effect of multiplying numbers in the trading nation. But if food cannot be

furnished, nor any other branch of production found out to support the correspondence, the taste for refinement will soon die away, and trade will stop in this quarter.

Had it not been for the furs in those countries adjacent to Hudson's Bay, and in Canada, the Europeans never would have thought of supplying instruments of luxury to those nations; and if the inhabitants of those regions had not taken a taste for the instruments of luxury furnished to them by the Europeans, they never would have become so indefatigable nor so dexterous hunters. At the same time we are not to suppose that ever these Americans would have come to Europe in quest of our manufactures. It is, therefore, owing to our merchants, that these nations are become in any degree fond of refinement; and this taste, in all probability, will not soon exceed the proportion of the productions of their country. From these beginnings of foreign trade it is easy to trace its increase.

One step towards this, is the establishing correspondences in foreign countries; and these are more or less necessary in proportion as the country where they are established is more or less polished, or acquainted with trade. They supply the want of posts, and point out to the merchants what proportion the productions of the country bear to the demand of the inhabitants for manufactures. This communicates an idea of commerce to the not-trading nation, and they insensibly begin to fix a determined value upon their own productions, which perhaps bore no determined value at all before.

Let us trace a little the progress of this refinement in the savages, in order to show how it has the effect of throwing the demand upon the traders, and of creating a competition among them, for the productions of the new country.

Experience shows, that, in a new discovered country, merchants constantly find some article or other of its productions, which runs out to a great account in commerce; and we see that the longer such a trade subsists, and the more the inhabitants take a taste for European manufactures, the more their own productions rise in their value, and the less profit is made by trading with them, even in cases where the trade is carried on by companies; which is a very wise institution for one reason, that it cuts off a competition between our merchants.

This is the best means of keeping prices low in favour of the nation; however, it may work a contrary effect with respect to individuals who must buy from these monopolies.

When companies are not established, and when trade is open, our merchants, by their eagerness to profit by the new trade, betray the secrets of it; they enter into competition for the purchase of the foreign produce; and this raises prices, and favours the commerce of the most ignorant savages.

§ 4. *Consequences of the Introduction of a passive foreign Trade among a People who live in Simplicity and Idleness.*

WE now suppose the arrival of traders, all in one interest, with instruments of luxury and refinement, at a port in a country of great simplicity of manners, abundantly

abundantly provided by nature with great advantages for commerce, and peopled by a nation capable of adopting a taste for superfluities.

The first thing the merchants do is, to expose their goods, and point out the advantages of many things, either agreeable or useful to mankind in general, such as wines, spirits, instruments of agriculture, arms and ammunition for hunting, nets for fishing, manufactures for clothing, and the like. The advantages of these are presently perceived, and such commodities are eagerly sought after.

The natives, on their side, produce what they most esteem, generally something superfluous or ornamental. The traders, after examining all circumstances, determine the object of their demand, giving the least quantity possible in return for this superfluity, in order to impress the inhabitants with a high notion of the value of their own commodities; but as this parsimony may do more hurt than good to their interest, they are very generous in making presents, from the principles mentioned above.

When the exchange is completed, and the traders depart, regret is commonly mutual; the one and the other are sorry that the superfluities of the country fall short. A return is promised by the traders, and assurances are given by the natives of a better provision another time.

What are the first consequences of this revolution?

It is evident, that, in order to supply an equivalent for this new want, more hands must be set to work than formerly. And it is evident also, that this augmentation of industry will not essentially increase numbers: Why? Because the produce of the industry is, in this case, intended to be exported. But, if we can find out any additional consumption at home, even implied by this new trade, it will have the effect of augmenting numbers. An example will make this plain.

Let us suppose the superfluity of this country to be the skins of wild beasts, not proper for food; the manufacture sought for, brandy. The brandy is sold for furs. He who has furs, or he who can spare time to hunt for them, will drink brandy in proportion: but there is no reason to conclude from this simple operation, that one man more in the country must necessarily be fed, or that any augmentation of agriculture must of consequence ensue from this new traffic.

But let us throw in a circumstance which may imply an additional consumption at home, and then examine the consequences.

A poor creature who has no equivalent to offer for food, who is miserable, and ready to perish for want of subsistence, goes a hunting, and kills a wolf; he comes to a farmer with the skin, and says, You are well fed, but you have no brandy; if you will give me a loaf, I will give you this skin, which the strangers are so fond of, and they will give you brandy. But, says the farmer, I have no more bread than what is sufficient for my own family. As for that, replies the other, I will come and dig in your ground, and you and I will settle our account as to the small quantity I desire of you. The bargain is made; the poor fellow gets his loaf, and lives at least; perhaps he marries, and the farmer gets a dram. But had it not been for this dram, that is, this new want, which was purchased by the industry of this poor fellow, by what

argument could he have induced the farmer to part with a loaf?

Here the sentiment of charity is excluded. This alone is a principle of multiplication; but as true it is, on the other hand, that could the poor fellow have got bread by begging, he would not probably have gone a hunting.

Here then it appears, that the very dawning of trade, in the most unpolished countries, implies a multiplication. This is enough to point out the first step, and to connect the subject of our present inquiries with what has been already discussed in relation to other circumstances.

So soon as all the furs are disposed of, and a taste for superfluity is introduced, both the traders and the natives will be equally interested in the advancement of industry in this country. Many new objects of profit for the first will be discovered, which the proper employment of the inhabitants, in reaping the natural advantages of their soil and climate, will make effectual. The traders will therefore endeavour to set on foot many branches of industry among the savages, and the allurements of brandy, arms, and clothing, will animate these in the pursuit of them.

When once this revolution is brought about; when those who formerly lived in simplicity become industrious; manners put on a new face.

That is to say, we now find two trading nations instead of one, with this difference, however, that as hitherto we have supposed the merchants all in one interest, the compound demand, that is, the competition of the buyers, has been, and must still continue on the side of the natives. This is a great prejudice to their interest: but as it is not supposed sufficient to check their industry, nor to restrain their consumption of the manufactures, let us here examine a little more particularly the consequences of the principle of demand in such a situation; for although we allow, that it can never change sides, yet it may admit of different modifications, and produce different effects, as we shall presently perceive.

The merchants we suppose all in one interest, consequently there can be no competition among them; consequently no check can be put upon their raising their prices, as long as the prices they demand are complied with. So soon as they are raised to the full extent of the abilities of the natives, or of their inclination to buy, the merchants have the choice of three things, which are all perfectly in their option; and the preference to be given to the one or the other, depends entirely upon themselves, and upon the circumstances we are going to point out.

First, they may support their *high* demand; that is, not lower their price; which will preserve a high estimation of the manufactures in the opinion of the inhabitants, and render the profits upon their trade the greatest possible. This part they may possibly take, if they perceive the natives doubling their diligence, in order to become able, in time, to purchase considerable cargoes at a high value; from which supposition is implied a strong disposition in the people to become luxurious, since nothing but want of ability prevents them from complying with the highest demand: but still another circumstance must concur, to engage the merchants not to lower their price. The

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great proportion of the goods they seek for in return, must be found in the hands of a few. This will be the case if slavery be established; for then there must be many poor and few rich: and they are commonly the rich consumers who proportion the price they offer, rather to their desires, than to the value of the thing.

The second thing which may be done is, to open the door to a *great* demand; that is to lower their prices. This will sink the value of the manufactures in the opinion of the inhabitants, and render profits less in proportion, although indeed, upon the voyage, the profits may be greater.

This part they will take, if they perceive the inhabitants do not incline to consume great quantities of the merchandize at a high value, either for want of abilities or inclination; and also, if the profits upon the trade depend upon a large consumption, as is the case in merchandize of a low value, and suited chiefly to the occasions of the lower sort. Such motives of expediency will be sufficient to make them neglect a high demand, and prefer a great one; and the more, when there is a likelihood that the consumption of low-priced goods in the beginning may beget a taste for others of a higher value, and thus extend in general the taste of superfluity.

A third part to be taken is the least politic, and perhaps the most familiar. It is to profit by the competition between the buyers, and encourage the rising of demand as long as possible; when this comes to a stop, to make a kind of auction, by first bringing down the prices to the level of the highest bidders, and so to descend by degrees, in proportion as demand sinks. Thus we may say with propriety, that demand commonly becomes great, in proportion as prices sink. By this operation, the traders will profit as much as possible, and sell off as much of their goods as the profits will permit.

But this plan, in a new discovered country, is not politic, as it both discovers a covetousness and a want of faith in the merchants, and also throws open the secrets of their trade to those who ought to be kept ignorant of them.

Let us next suppose, that the large profits of our merchants shall be discovered by others, who arrive at the same ports in a separate interest, and who enter into no combination which might prevent the natural effects of competition.

Let the states of demand among the natives be supposed the same as formerly, both as to height and greatness, in consequence of the operation of the different principles, which might have induced our merchants to follow one or other of the plans we have been describing: we must, however, still suppose, that they have been careful to preserve considerable profits upon every branch.

If we suppose the inhabitants to have increased in numbers, wealth, and taste for superfluity, since the last voyage, demand will be found rather on the rising hand. Upon the arrival of the merchants in competition with the former, both will offer to sale: but if both stand to the same prices, it is very natural to suppose, that the former dealers will obtain a preference; as *ceteris paribus* it is always an advantage to know and to be known. The last comers, therefore,

have no other way left to counterbalance this advantage, but to lower their prices.

This is a new phenomenon: here the fall of prices is not voluntary as formerly; nor consented to from expediency; not owing to a failure of demand, but to the influence of a new principle of commerce, to wit, a double competition, which we shall now examine.

§ 5. Of double Competition.

WHEN competition is much stronger on one side of the contract than on the other, it is called *simple*. This is the species of competition which is implied in the term *high demand*, or when it is said that *demand raises prices*.

Double competition is, when, in a certain degree, it takes place on both sides of the contract at once, or vibrates alternately from one to the other. This is what restrains prices to the adequate value of merchandize.

The great difficulty is to distinguish clearly between the principles of *demand* and those of *competition*: here then follows the principal differences between the two, relatively to the effects they produce severally in the mercantile contract of buying and selling, which we here express shortly by the word *contract*.

Simple demand is what brings the quantity of a commodity to market. Many demand, who do not buy; many offer, who do not sell. This demand is called *great* or *small*; it is said to increase, to augment, to swell; and is expressed by these and other synonymous terms, which mark an augmentation or diminution of quantity. In this species, two people never demand the same thing, but a part of the same thing, or things quite alike.

Compound demand is the principal which raises prices, and can never make them sink; because in this case more than one demands the very same thing. It is solely applicable to the buyers, in relation to the price they offer. This demand is called *high* or *low*, and is said to rise, to fall, to mount, to sink, and is expressed by these and other synonymous terms.

Simple competition, when between buyers, is the same as *compound* or *high demand*; but differs from it in so far, as this may equally take place among sellers, which *compound demand* cannot; and then it works a contrary effect: it makes prices sink, and is synonymous with *low demand*: it is this competition which overturns the balance of work and demand.

Double competition is what is understood to take place in almost every operation of trade; it is this which prevents their excessive rise of prices; it is this which prevents their excessive fall. While double competition prevails, the balance is perfect, trade and industry flourish.

The capital distinction, therefore, between the terms *demand* and *competition* is, that *demand* is constantly relative to the buyers; and when money is not the price, as in barter, then it is relative to that side upon which the greatest *competition* is found.

We therefore say, with regard to *prices*, demand is *high* or *low*. With regard to the *quantity of merchandize*, demand is *great* or *small*. With regard to *competition*, it is always called *great* or *small*, *strong* or *weak*.

Competition is, with equal propriety, applicable to both

both parties in the contract. A *competition* among buyers is a proper expression; a *competition* among sellers, who have the merchandize, is fully as easily understood, though it be not quite so striking, for reasons which an example will make plain.

You come to a fair, where you find a great variety of every kind of merchandize, in the possession of different merchants. These, by offering their goods to sale, constitute a tacit competition; every one of them wishes to sell in preference to another, and at the same time with the best advantage to himself.

The buyer begins, by cheapening at every shop. The first price asked marks the covetousness of the seller: the first price offered, the avarice of the buyer. From this operation competition begins to work its effects on both sides, and so becomes double. The principles which influence this operation are now to be deduced.

It is impossible to suppose the same degree of eagerness, either to buy or sell, among several merchants; because the degree of eagerness is exactly in proportion to their views of profit; and as these must necessarily be influenced and regulated by different circumstances, that buyer, who has the best prospect of selling again with profit, obliges him, whose prospect is not so good, to content himself with less; and that seller, who has bought to the best advantage, obliges him, who has paid dearer for the merchandize, to moderate his desire of gain.

It is from these principles, that competition among buyers and sellers must take place. This is what confines the fluctuation of prices within limits which are compatible with the reasonable profits of both buyers and sellers; for we must constantly suppose the whole operation of buying and selling to be performed by merchants; the buyer cannot be supposed to give so high a price as that which he expects to receive when he distributes to the consumers, nor can the seller be supposed to accept of a lower than that which he paid to the manufacturer. This competition is properly called *double*, because of the difficulty to determine upon which side it stands; the same merchant may have it in his favour upon certain articles, and against him upon others; it is continually in vibration, and the arrival of every post may less or more pull down the heavy scale.

In every transaction between merchants, the profit resulting from the sale must be exactly distinguished from the value of the merchandize. The first may vary, the last never can. It is this profit alone which can be influenced by competition; and it is for that reason we find such uniformity every where in the prices of goods of the same quality.

The competition between sellers does not appear so striking as that between buyers; because he who offers to sale, appears only passive in the first operation; whereas the buyers present themselves one after another; they make a demand when the merchandize is refused to one at a certain price; a second either offers more, or does not offer all: but so soon as another seller finds his account in accepting the price the first had refused, then the first enters into competition, providing his profits will admit his lowering the first price; and thus competition takes place among the

sellers, until the profits upon their trade prevent prices from falling lower.

In all markets this competition is varying, though insensibly, on many occasions; but in others the vibrations are very perceptible. Sometimes it is found strongest on the side of the buyers; and in proportion as this grows, the competition between the sellers diminishes. When the competition between the former has raised prices to a certain standard, it comes to a stop; then the competition changes sides, and takes place among the sellers, eager to profit of the highest price. This makes prices fall; and according as they fall, the competition among the buyers diminishes. They still wait for the lowest period. At last it comes; and then perhaps some new circumstance, by giving the balance a kick, disappoints their hopes. If therefore it ever happens, that there is but one interest upon one side of the contract, as in the example in the former section, where we supposed the sellers united, you perceive, that the rise of the price, occasioned by the competition of the buyers, and even its coming to a stop, could not possibly have the effect of producing any competition on the other side; and therefore, if prices come afterwards to sink, the fall must have proceeded from the prudential considerations of adapting the price to the faculties of those who, from the height of it, had withdrawn their demand.

From these principles of competition, the forestalling of markets is made a crime, because it diminishes the competition which ought to take place between different people, who have the same merchandize to offer to sale. The forestaller buys all up, with an intention to sell with more profit, as he has by that means taken other competitors out of his way, and appears with a single interest on one side of the contract, in the face of many competitors on the other. This person is punished by the state, because he has prevented the price of the merchandize from becoming justly proportioned to the real value; he has robbed the public and enriched himself; and in the punishment he makes restitution. Here occur two questions to be resolved, for the sake of illustration.

Can competition among buyers possibly take place, when the provision made is more than sufficient to supply the quantity demanded? On the other hand, can competition take place among the sellers, when the quantity demanded exceeds the total provision made for it?

We think it may in both cases; because in the one and the other, there is a competition implied on one side of the contract, and the very nature of this competition implies a possibility of its coming on the other, provided separate interests be found upon both sides. But to be more particular:

1. Experience shows, that however justly the proportion between the demand and the supply may be determined in fact, it is still next to impossible to discover it exactly, and therefore the buyers can only regulate the prices they offer, by what they may reasonably expect to sell for again. The sellers, on the other hand, can only regulate the prices they expect, by what the merchandize has cost them when brought to market. We have already shown, how, under such circumstances, the several interests of individuals affect each other, and make the balance vibrate.

2. The proportion between the supply and the demand is seldom other than *relative* among merchants, who are supposed to buy and sell, not from necessity, but from a view to profit. What we mean by *relative* is, that their demand is *great* or *small* according to prices; there may be a great demand for grain at 35s. *per* quarter, and no demand at all for it at 40s.; that is, among merchants.

It is essential to attend to the smallest circumstance in matters of this kind. The circumstance we mean, is the difference we find in the effect of competition, when it takes place purely among merchants on both sides of the contract, and when it happens, that either the consumers mingle themselves with the merchant-buyers or the manufacturers, that is, the furnishers, mingle themselves with the merchant-sellers. This combination we shall illustrate by the solution of another question, and then conclude with a few reflections upon the whole.

Can there be no case formed, where the competition upon one side may subsist, without a possibility of its taking place on the other, although there should be separate interests upon both?

The case is hardly supposable among merchants, who buy and sell with a view to profit; but it is absolutely supposable, and that is all, when the direct consumers are the buyers; when the circumstances of one of the parties is perfectly known; and when the competition is so strong upon one side, as to prevent a possibility of its becoming double, before the whole provision is sold off, or the demand satisfied. Let us have recourse to examples.

Grain arriving in a small quantity, at a port where the inhabitants are starving, produces so great a competition among the consumers, who are the buyers, that their necessity becomes evident; all the grain is generally bought up before prices can rise so high as to come to a stop; because nothing but want of money, that is, an impossibility of complying with the prices demanded by the merchants, can restrain them: but if you suppose, even here, that prices come naturally to a stop; or that, after some time, they fall lower, from prudential considerations; then there is a possibility of a competition taking place among the sellers, from the principles above deduced. If, on the contrary, the stop is not natural, but occasioned by the interposition of the magistrate, from humanity, or the like, there will be no competition, because then the principles of commerce are suspended; the sellers are restrained on one side, and they restrain the buyers on the other. Or rather indeed, it is the magistrate, or compassion, who in a manner fixes the price, and performs the office of both buyer and seller.

A better example still may be found, in a competition among sellers; where it may be so strong as to render a commodity in a manner of no value at all, as in the case of an uncommon and unexpected draught of fish, in a place of small consumption, when no preparations have been made for salting them. There can be then no competition among the buyers; because the market cannot last, and they find themselves entirely masters, to give what price they please, being sure the sellers must accept of it, or lose their merchandise. In the first example, humanity commonly stops the activity of the principle of competition; in

the other, it is stopped by a certain degree of fair dealing, which forbids the accepting of a merchandise for nothing.

In proportion therefore as the rising of prices can stop demand, or the sinking of prices can increase it, in the same proportion will competition prevent either the rise or the fall from being carried beyond a certain length: and if such a case can be put, where the rising of prices cannot stop demand, nor the lowering of prices augment it, in such cases double competition has no effect; because these circumstances unite the most separate interests of buyers and sellers in the mercantile contract; and when upon one side there is no separate interest, there can then be no competition.

From what has been said, we may form a judgment of the various degrees of competition. A book not worth a shilling, a fish of a few pounds weight, are often sold for considerable sums. The buyers here are not merchants. When an ambassador leaves a court in a hurry, things are sold for less than the half of their value: he is no merchant, and his situation is known. When, at a public market, there are found consumers, who make their provision; or manufacturers, who dispose of their goods for present subsistence; the merchants, who are respectively upon the opposite side of the contract to these, profit of their competition; and those who are respectively upon the same side with them, stand by with patience until they have finished their business. Then matters come to be carried on between merchant and merchant, and then profits may rise and fall in the proportion of quantity to demand; that is to say, if the provision is less than the demand, the competition among the demanders, or the rise of the price, will be in the compound proportion of the falling short of the commodity, and of the prospect of selling again with profit. It is this combination which regulates the competition, and keeps it within bounds. It can affect but the profits upon the transaction: the intrinsic value of the commodity stands immovable: nothing is ever sold below the real value: nothing is ever bought for more than it may probably bring. We mean in general. Whereas, so soon as consumers and needy manufacturers mingle in the operation, all proportion is lost. The competition between them is too strong for the merchants; the balance vibrates by jerks. In such markets merchants seldom appear: the principal objects there, are the fruits and productions of the earth, and articles of the first necessity for life, not manufactures strictly so called. A poor fellow often sells to purchase bread to eat; not to pay what he did eat while he was employed in the work he disposes of. The consumer often measures the value of what he is about to purchase, by the weight of his purse, and his desire to consume.

§ 6. Of what is called *Expence, Profit, and Loss*.

THE term *expence*, when simply expressed, without any particular relation, is always understood to be relative to money. This kind is distinguished under the three heads of *private*, *public*, and *national*.

1. *Private expence* is what a private person, or private society, lays out, either to provide articles of consumption, or something more permanent, which may be conducive to their ease, convenience, or advantage.

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Thus we say, a *large domestic expence*, relative to one who spends a great income. We say, a merchant has been at *great expence* for magazines, for living, for clerks, &c. but never that he has been at any in buying goods. In the same way a manufacturer may expend for building, machines, horses, and carriages, but never for the matter he manufactures. When a thing is bought in order to be sold again, the sum employed is called money *advanced*; when it is bought not to be sold, it may be said to be *expended*.

2. *Public expence* is the employment of that money which has been contributed by individuals for the current service of the state. The contribution, or gathering it together, represents the effects of many articles of *private expence*; the laying it out when collected, is *public expence*.

3. *National expence* is what is expended out of the country; this is what diminishes national wealth. The principal distinction to be here attended to is between public expence, or the laying out of public money, and national expence, which is the alienating the nation's wealth in favour of strangers. Thus the greatest public expence imaginable may be no national expence; because the money may remain at home. On the other hand, the smallest public, or even private expence, may be a national expence; because the money may go abroad.

Profit and loss is divided into *positive, relative, and compound*. *Positive profit* implies no loss to any body; it results from an augmentation of labour, industry, or ingenuity, and has the effect of swelling or augmenting the public good.

Positive loss implies no profit to any body; it is what results from the cessation of the former, or of the effects resulting from it, and may be said to diminish the public good.

Relative profit is what implies a loss to somebody; it marks a vibration of the balance of wealth between parties, but implies no addition to the general stock.

Relative loss is what, on the contrary, implies a profit to somebody; it also marks a vibration of the balance, but takes nothing from the general stock.

The *compound* is easily understood: it is that species of profit and loss which is partly relative and partly positive.

§ 7. *The general consequences resulting to a trading Nation, upon the opening of an active foreign Commerce.*

A NATION which remains passive in her commerce is at the mercy of those who are active, and must be greatly favoured indeed by natural advantages, or by a constant flux of gold and silver from her mines, to be able to support a correspondence not entirely hurtful to the augmentation of her wealth.

When we look upon the wide field which here opens to our view, we are perplexed with too great a variety of objects. In one part, we see a decent and comely beginning of industry; wealth flowing gently in to recompence ingenuity; numbers both augmenting, and every one becoming daily more useful to another; agriculture proportionally extending itself; no violent revolutions; no exorbitant profits; no insolence among the rich; no excessive misery among the poor; multitudes employed in producing; great economy upon

consumption; and all the instruments of luxury, daily produced by the hands of the diligent, going out of the country for the service of strangers; not remaining at home for the gratification of sensuality. At last the augmentations come insensibly to a stop. Then these rivers of wealth, which were in brisk circulation through the whole world, and which returned to this trading nation as blood returns to the heart, only to be thrown out again by new pulsations, begin to be obstructed in their course; and flowing abroad more slowly than before, come to form stagnations at home. These, impatient of restraint, soon burst out into domestic circulation. Upon this cities swell in magnificence of buildings; the face of the country is adorned with palaces, and becomes covered with groves; luxury shines triumphant in every part; inequality becomes more striking to the eye; and want and misery appear more deformed, from the contrast: even fortune grows more whimsical in her inconstancy; the beggar of the other day now rides in his coach; and he who was born in a bed of state, is seen to die in a gaol or in an alms-house. Such are the effects of great domestic circulation.

The statesman looks about with amazement; he who was wont to consider himself as the first man in the society in every respect, perceives himself, perhaps, eclipsed by the lustre of private wealth, which avoids his grasp when he attempts to seize it. This makes his government more complex and more difficult to be carried on; he must now avail himself of art and address, as well as of power and force. By the help of cajoling and intrigues, he gets a little into debt; this lays a foundation for public credit, which, growing by degrees, and in its progress assuming many new forms, becomes, from the most tender beginnings, a most formidable monster, striking terror into those who cherished it in its infancy. Upon this, as upon a triumphant war-horse, the statesman gets a stride; he then appears formidable a-new; his head turns giddy; he is choaked with the dust he has raised; and at the moment he is ready to fall, to his utter astonishment and surprise, he finds a strong monied interest, of his own creating, which, instead of swallowing him up as he apprehended, flies to his support. Through this he gets the better of all opposition, he establishes taxes, multiplies them, mortgages his fund of subsistence; either becomes a bankrupt, and rises again from his ashes; or if he be less audacious, he stands trembling and tottering for a while on the brink of the political precipice. From one or the other of these perilous situations, he begins to discover an endless path, which, after a multitude of windings, still returns into itself, and continues an equal course through this vast labyrinth.

It is now full time to leave off rhapsody, and return to reasoning and cool enquiry, concerning the more immediate and more general effects and revolutions produced by the opening of a foreign trade in a nation of industry.

The first and most sensible alteration will be an increase of demand for manufacturers, because by supplying the wants of strangers, the number of consumers will now be considerably augmented. What again will follow upon this, must depend upon circumstances.

If this revolution in the state of demand should prove too violent, the consequence of it will be to raise demand; if it should prove gradual, it will increase it. This distinction is well understood, and the consequence appears just: for, if the supply do not increase in proportion to the demand, a competition will ensue among the demanders; which is the common effect of such sudden revolutions. If, on the other hand, a gentle increase of demand should be accompanied with a proportional supply, the whole industrious society will grow in vigour, and in wholesome stature, without being sensible of any great advantage or inconveniency; the change of their circumstances will even be imperceptible.

The immediate effects of the violent revolution will, in this example, be flattering to some and disagreeable to others. Wealth will be found daily to augment, from the rising of prices, in many branches of industry. This will encourage the industrious classes, and the idle consumers at home will complain. We have already dwelt abundantly long upon the effect resulting from this to the lower classes of the people, in providing them with a certain means of subsistence. Let us now examine in what respect even the higher classes will be made likewise to feel the good effects of this general change, although at first they may suffer a temporary inconveniency from it.

Farmers, as has been observed, will have a greater difficulty in finding servants, who, instead of labouring the ground, will choose to turn themselves to manufactures. This we have considered in the light of purging the lands of superfluous mouths; but every consequence in this great chain of politics draws other consequences after it; and as they follow one another, things put on different faces, which affect classes differently. The purging of the land is but one of the first; here follows another.

The desertion of the hands employed in a trifling agriculture will at first, no doubt, embarrass the farmers; but in a little time every thing becomes balanced in a trading nation, because here every industrious man must advance in prosperity, in spite of all general combinations of circumstances.

In the case before us, the relative profits upon farming must soon become greater than formerly, because of this additional expence which must affect the whole class of farmers; consequently, this additional expence, instead of turning out to be a loss to either landlord or farmer, will, after some little time, turn out to the advantage of both; because the produce of the ground, being indispensably necessary to every body, must in every article increase in its value. Thus in a short time accounts will be nearly balanced on all hands; that is to say, the same proportion of wealth will, *ceteris paribus*, continue the same among the industrious. We say among the industrious; for those who are either idle, or even negligent, will be great losers.

A proprietor of land, inattentive to the causes of his farmer's additional expence, may very imprudently suffer his rents to fall, instead of assisting him on a proper occasion, in order to make them afterwards rise the higher.

Those who live upon a determined income in mo-

ney, and who are nowise employed in traffic, nor in any scheme of industry, will, by the augmentation of prices, be found in worse circumstances than before.

In a trading nation every man must turn his talents to account, or he will undoubtedly be left behind in this universal emulation, in which the most industrious, the most ingenious, and the most frugal, will constantly carry off the prize.

This consideration ought to be a spur to every body. The richest men in a trading nation have no security against poverty; we mean proportional poverty; for though they diminish nothing of their income, yet, by not increasing it in proportion to others, they lose their rank in wealth, and from the first class in which they stood they will slide insensibly down to a lower.

There is one consequence of an additional beneficial trade, which raises demand and increases wealth; but if we suppose no proportional augmentation of supply, it will prove at best but an airy dream which lasts for a moment; and when the gilded scene is passed away, numberless are the inconveniences which are seen to follow.

We shall now point out the natural consequences of this augmentation of wealth drawn from foreign nations, when the statesman remains inattentive to increase the supply both of food and manufactures, in proportion to the augmentation of mouths, and of the demand for the produce of industry.

In such a situation profits will daily swell, and every scheme for reducing them within the bounds of moderation, will be looked upon as a hurtful and unpopular measure: be it so; but let us examine the consequences.

We have said, that the rise of demand for manufactures naturally increases the value of work: now we must add, that under such circumstances, the augmentation of riches in a country, either not capable of improvement as to the soil, or where precautions have not been taken for facilitating a multiplication of inhabitants, by the importation of subsistence, will be productive of the most calamitous consequences.

On one side, this wealth will effectually diminish the mass of the food before produced; and on the other, will increase the number of useless consumers. The first of these circumstances will raise the demand for food; and the second will diminish the number of useful free hands, and consequently raise the price of manufactures: here are shortly the outlines of this progress.

The more rich and luxurious a people are, the more delicate they become in their manner of living; if they fed on bread formerly, they will now feed on meat; if they fed on meat, they will now feed on fowl. The same ground which feeds a hundred with bread, and a proportional quantity of animal-food, will not maintain an equal number of delicate livers. Food must then become more scarce; demand for it rises; the rich are always the strongest in the market; they consume the food, and the poor are forced to starve. Here the wide door to modern distress opens; to wit, a hurtful competition for subsistence. Farther, when a people become rich, they think less

of economy; a number of useless servants are hired, to become an additional dead weight on consumption; and when their starving countrymen cannot supply the extravagance of the rich so cheaply as other nations, they either import instruments of foreign luxury, or seek to enjoy them out of their own country, and thereby make restitution of their gains.

Is it not therefore evident, that if, before things come to this pass, additional subsistence be not provided by one method or other, the number of inhabitants must diminish; although riches may daily increase by a balance of additional matter supposed to be brought into the country in consequence of the hitherto beneficial foreign trade? This is not all. We say farther, that the beneficial trade will last for a time only. For the infallible consequence of the rise of prices at home will be, that those nations which at first consumed your manufactures, perceiving the gradual increase of their price, will begin to work for themselves; or finding out your rivals who can supply them cheaper, will open their doors to them. These again, perceiving the great advantages gained by your traders, will begin to supply the market; and since every thing must be cheaper in countries where we do not suppose the concurrence of all the circumstances mentioned above, these nations will supplant you, and be enriched in their turn.

Here comes a new revolution. Trade is come to a stop: what then becomes of all the hands which were formerly employed in supplying the foreign demands?

Were revolutions so sudden as we are obliged to represent them, all would go to wreck; in proportion as they happen by quicker or slower degrees, the inconveniences are greater or smaller.

Prices, we have said, are made to rise by competition. If the competition of the strangers was what raised them, the distress upon the manufacturers will be in proportion to the suddenness of their deserting the market. If the competition was divided between the strangers and the home-consumers, the inconveniences which ensue will be less; because the desertion of the strangers will be in some measure made up by an increase of home-consumption which will follow upon the fall of prices. And if, in the third case, the natives have been so imprudent, as not only to support a competition with the strangers, and thereby disgust them from coming any more to market, but even to continue the competition between themselves, the whole loss sustained by the revolution will be national. Wealth will cease to augment; but the inconveniences, in place of being felt by the manufacturers, will only affect the state; those will continue in affluence, extolling the generosity of their countrymen, and despising the poverty of the strangers who had enriched them.

Domestic luxury will here prove an expedient for preserving from ruin the industrious part of a people, who in subsisting themselves had enriched their country. No change will follow in their condition; they will go on with a painful assiduity to labour: and if the consequences of it become now hurtful to one part of the state, they must at least be allowed to be essentially necessary for the support of the other.

But that luxury is no necessary concomitant of fo-

reign trade, in a nation where the true principles of it are understood, will appear very plain, from a contrast we are now going to point out, in the example of a modern state, renowned for its commerce and frugality. The country is Holland.

A set of industrious and frugal people were assembled in a country by nature subject to many inconveniences, the removing of which necessarily employed abundance of hands. Their situation upon the continent, the power of their former masters, and the ambition of their neighbours, obliged them to keep great bodies of troops. These two articles added to the numbers of the community, without either enriching the state by their labour exported, or producing food for themselves or countrymen.

The scheme of a commonwealth was calculated to draw together the industrious; but it has been still more useful in subsisting them: the republican form of government being there greatly subdivided, vests authority sufficient in every part of it, to make suitable provision for their own subsistence; and the tie which unites them, regards only matters of public concern. Had the whole been governed by one sovereign, or by one council, this important matter never could have been effectuated.

It would be impossible for the most able minister that ever lived, to provide nourishment for a country so extended as France, or even as England, supposing these as fully peopled as Holland is; even although it should be admitted that a sufficient quantity of food might be found in other countries for their subsistence. The enterprise would be too great, abuses would multiply; the consequence would be, that the inhabitants would die for want. But in Holland the case is different: every little town takes care of its own inhabitants; and this care being the object of application and profit to so many persons, is accomplished with success.

When once it is laid down as a maxim in a country, that food must of necessity be got from abroad in order to feed the inhabitants at home, the corn-trade becomes considerable, and at the same time certain, regular, and permanent. This was the case in Holland: as the inhabitants were industrious, the necessary consequence has been, a very extraordinary multiplication; and at the same time such an abundance of grain, that, instead of being in want themselves, they often supply their neighbours. There are many examples of England's being supplied with grain from thence; and, which is still more extraordinary, from the re-exportation of the very produce of its own fruitful soil.

It is therefore evident, that the only way to support industry, is to provide a supply of subsistence, constantly proportional to the demand that may be made for it. This is a precaution indispensably necessary for preventing hurtful competition. This is the particular care of the Dutch: so long as it can be effectual, their state can fear no decline; but whenever they come to be distressed in the markets, upon which they depend for subsistence, they will sink into ruin. It is by mere dint of frugality, cheap and parsimonious living, that the navigation of this industrious people is supported. Constant employment, and an accumulation of almost imperceptible gains, fill their

their coffers with wealth, in spite of the large outgoings to which their own proper nourishment yearly forces them. The large profits upon industry in other countries, which are no proof of generosity, but a fatal effect of a scanty subsistence, is far from dazzling their eyes. They seldom are found in the list of competitors at any foreign port; if they have their cargo to dispose of, they wait with pleasure in their own vessels, consuming their own provisions, and at last accept of what others have left. It may be said, that many other circumstances concur in favour of the Dutch, besides the article of subsistence. Without disputing this matter, it may be observed, that if a computation be made of the hands employed in providing subsistence, and of those who are severally taken up in supplying every other want, their numbers will be found nearly to balance one another in the most luxurious countries. From this we may conclude, that the article of food, among the lower classes, must bear a very high proportion to all the other articles of their

consumption; and therefore a diminution upon the price of subsistence, must be of infinite consequence to manufacturers who are obliged to buy it. From this consideration, let us judge of the consequence of such augmentations upon the price of grain as are familiar to us; 30 or 40 *per cent.* seems nothing. Now this augmentation operates upon two-thirds, at least, of the whole expence of a labouring man: let any one who lives in tolerable affluence make the application of this to himself, and examine how he would manage his affairs, if, by accidents of rains or winds, his expences were to rise 30 *per cent.* without a possibility of restraining them; for this is unfortunately the case with all the lower classes. From whence it may be concluded, that the keeping food cheap, and still more the preserving it at all times at an equal standard, is the fountain of the wealth of Holland; and that any hurtful competition in this article must beget a disorder which will affect the whole of the manufacturers of a state.

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COMMERCE, a handsome town of France in the duchy of Bar, with the title of a principality, and a magnificent castle. It is seated on the river Menne, in E. Long. 5. 24. N. Lat. 48. 20.

COMMERSONIA, in botany: A genus of the pentagynia order, belonging to the pentandria class of plants. The calyx is a monophyllous, five-parted, corolliferous perianthium, with sharp ovated segments; the corolla has five linear petals; the stamens are five very short filaments at the bases of the petals; the pericarpium a globular, hard, quinquelocular nut, with two ovated seeds in each division.

COMMUNION, an office in the liturgy of the church of England, appointed to be read on Ash-Wednesday, or the first day of Lent. It is substituted in the room of that *godly discipline in the primitive church*, by which (as the introduction to the office expresses it), "such persons, as stood convicted of notorious sins, were put to open penance, and punished in this world, that their souls might be saved in the day of the Lord; and that others, admonished by their example, might be the more afraid to offend." This discipline, in after ages, degenerated, in the church of Rome, into a formal confession of sins upon Ash-Wednesday, and the empty ceremony of sprinkling ashes upon the heads of the people. Our reformers wisely rejected this ceremony, as mere shadow and show; and substituted this office in its room, which is, *A denunciation of God's anger and judgment against sinners*: that the people, being apprised of God's wrath and indignation against sin, may not, through want of discipline in the church, be encouraged to follow and pursue them; but rather be moved to supply that discipline to themselves, and so as to avoid being judged and condemned at the tribunal of God.

COMMUNATORY, an appellation given to whatever threatens punishment, or some penalty. Thus, in France, when an exile is enjoined not to return under pain of death, it is deemed a *communatory* penalty; since, if he do return, it is not strictly executed;

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but a second injunction is laid on him, which is more than comminatory, and, from the day of the date thereof, imports death without remedy.

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COMMINGES, a province of France, 45 miles in length, and 15 in breadth; bounded on the north by Gascony, on the south by Catalonia, on the east by Cousserans, and on the west by Bigorra. Its principal trade consists in cattle, mules, and corn. St Bertrand is the capital town.

COMMUNITION, denotes the breaking, or rather grinding, a body to very small particles.

COMMIRE (John), a celebrated Latin poet, born at Amboise in 1625, entered into the society of the Jesuits, and taught polite literature and divinity. He died at Paris in 1702. We have a volume of his Latin poems, and a collection of his posthumous works. His odes and fables are more particularly admired.

COMMISSARY, in the ecclesiastical law, an officer of the bishop, who exercises spiritual jurisdiction in places of a diocese so far from the Episcopal see, that the chancellor cannot call the people to the bishop's principal consistory court, without giving them too much inconveniency.

COMMISSARY-COURT, in Scotland, a court originally constituted by the bishops for executing in their name an usurped jurisdiction; and was anciently called the *bishop's court*, *curia Christianitatis*, or *consistorial court*. This court was modelled by queen Mary at the Reformation, and continues till this day.

COMMISSARY, in a military sense, is of different sorts.

COMMISSARY-General of the *Musters*, an officer appointed to muster the army, as often as the general thinks proper, in order to know the strength of each regiment and company, to receive and inspect the muster-rolls, and to keep an exact state of the strength of the army.

COMMISSARY of *Horses*, an officer in the artillery, appointed to have the inspection of the artillery-horses, to see them mustered, and to send such orders as he receives.

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receives from the commanding officer of the artillery, by some of the conductors of horses, of which he has a certain number for his assistants.

COMMISSARY of Provisions, an officer who has the charge of furnishing the army with provisions.

COMMISSARY of Stores, an officer in the artillery, who has the charge of all the stores, for which he is accountable to the office of ordnance.

COMMISSION, in common law, the warrant or letters patent, which all persons exercising jurisdiction have to empower them to hear or determine any cause or suit, as the commission of the judges, &c.

COMMISSION of Bankruptcy, is the commission that issues from the lord chancellor, on a person's becoming a bankrupt within any of the statutes, directed to certain commissioners appointed to examine into it, and to secure the bankrupt's lands and effects for the satisfaction of his creditors. See the article BANKRUPT.

The proceedings on a commission of bankrupt may be divided, 1. Into those which affect the bankrupt himself. 2. Into those which affect his property.

Blackstone's
Comment.

1. As to those of the former kind, there must in the first place be a petition to the lord chancellor by one creditor to the amount of L. 100, or by two to the amount of L. 150, or by three or more to the amount of L. 200; upon which he grants a commission to such discreet persons as to him shall seem good, who are then styled commissioners of bankrupt. The petitioners, to prevent malicious applications, must be bound in a security of L. 200, to make the party amends, in case they do not prove him a bankrupt. And if, on the other hand, they receive any money or effects from the bankrupt, as a recompense for suing out the commission, so as to receive more than their rateable dividends of the bankrupt's estate, they forfeit not only what they shall have so received, but their whole debt. When the commission is awarded and issued, the commissioners are to meet at their own expence, and to take an oath for the due execution of their commission, and to be allowed a sum not exceeding 20s. *per diem* each, at every sitting. And no commission of bankruptcy shall abate or be void on any demise on the crown.

When the commissioners have received their commission, they are first to receive proof of the person's being a trader, and having committed some act of bankruptcy; and then to declare him bankrupt, if proved so; and to give notice thereof in the gazette, and at the same time to appoint three meetings. At one of these meetings an election must be made of assignees, or persons to whom the bankrupt's estate shall be assigned, and in whom it shall be vested for the benefit of the creditors; which assignees are chosen by the major part, in value, of the creditors who shall then have proved their debts; but may be originally appointed by the commissioners, and afterwards approved or rejected by the creditors: but no creditor shall be admitted to vote in the choice of assignees, whose debt, on the balance of accounts, does not amount to L. 10. And at the third meeting at farthest, which must be on the 42d day after the advertisement in the gazette, the bankrupt, upon notice also personally served upon him, or left at his usual

place of abode, must surrender himself personally to the commissioners, and must thenceforth in all respects conform to the directions of the statutes of bankruptcy; or, in default thereof, shall be guilty of felony without benefit of clergy, and shall suffer death, and his goods and estate shall be divided among his creditors.

In case the bankrupt absconds, or is likely to run away between the time of the commission issued and the last day of surrender, he may, by warrant from any judge or justice of the peace, be apprehended and committed to the county gaol, in order to be forthcoming to the commissioners, who are also empowered immediately to grant a warrant for seizing his goods and papers.

When the bankrupt appears, the commissioners are to examine him touching all matters relating to his trade and effects. They may also summon before them, and examine, the bankrupt's wife, and any other person whatsoever, as to all matters relating to the bankrupt's affairs: And in case any of them shall refuse to answer, or shall not answer fully, to any lawful question, or shall refuse to subscribe such their examination, the commissioners may commit them to prison without bail, till they make and sign a full answer; the commissioners specifying in their warrant of commitment the question so refused to be answered. And any gaoler, permitting such person to escape or go out of prison, shall forfeit L. 500 to the creditors.

The bankrupt, upon this examination, is bound, upon pain of death, to make a full discovery of all his estate and effects as well in expectancy as possession, and how he has disposed of the same; together with all books and writings relating thereto: and is to deliver up all in his power to the commissioners (except the necessary apparel of himself, his wife, and his children); or, in case he conceals or embezzles any effects to the amount of L. 20, or with-holds any book or writings, with intent to defraud his creditors, he shall be guilty of felony without benefit of clergy.

After the time allowed the bankrupt for such discovery is expired, any other person voluntarily discovering any part of his estate before unknown to the assignees, shall be intitled to five *per cent.* out of the effects so discovered, and such farther reward as the assignees and commissioners shall think proper. And any trustee wilfully concealing the estate of any bankrupt, after the expiration of 42 days, shall forfeit L. 100, and double the value of the estate concealed, to the creditors.

Hitherto every thing is in favour of the creditors; and the law seems to be pretty rigid and severe against the bankrupt; but, in case he proves honest, it makes him full amends for all this rigour and severity. For, if the bankrupt hath made an ingenuous discovery, hath conformed to the directions of the law, and hath acted in all points to the satisfaction of his creditors; and if they, or four parts in five of them in number and value (but none of them creditors for less than L. 20), will sign a certificate to that purport; the commissioners are then to authenticate such certificate under their hands and seals, and to transmit it to the lord chancellor: and he, or two judges whom he shall appoint, on oath made by the bankrupt that such cer-

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tificate was obtained without fraud, may allow the same; or disallow it, upon cause shown by any of the creditors of the bankrupt.

If no cause be shown to the contrary, the certificate is allowed of course; and then the bankrupt is intitled to a decent and reasonable allowance out of his effects, for his future support and maintenance, and to put him in a way of honest industry. This allowance is also in proportion to his former good behaviour, in the early discovery of the decline of his affairs, and thereby giving his creditors a large dividend. For if his effects will not pay one half of his debts, or 10s. in the pound, he is left to the discretion of the commissioners and assignees, to have a competent sum allowed him, not exceeding 3 per cent.; but if they pay 10s. in the pound, he is to be allowed 5 per cent.; if 12s. and 6d. then 7½ per cent.; and if 15s. in the pound, then the bankrupt shall be allowed 10 per cent.; provided that such allowance do not in the first case exceed L. 200, in the second L. 250, and in the third L. 300.

Besides this allowance, he has also an indemnity granted him, of being free and discharged for ever from all debts owing by him at the time he became a bankrupt; even though judgment shall have been obtained against him, and he lies in prison upon execution for such debts; and, for that among other purposes, all proceedings on commission of bankrupt, are, on petition, to be entered on record, as a perpetual bar against actions to be commenced upon this account: though, in general, the production of the certificate properly allowed shall be sufficient evidence of all previous proceedings. Thus the bankrupt becomes a clear man again; and, by the assistance of his allowance and his own industry, may become a useful member of the commonwealth: which is the rather to be expected, as he cannot be entitled to these benefits, but by the testimony of his creditors themselves of his honest and ingenuous disposition; and unless his failures have been owing to misfortunes, rather than to misconduct and extravagance.

2. As to the proceedings which affect the bankrupt's property.

By virtue of the statutes before mentioned, all the personal estate and effects of the bankrupt are considered as vested, by the act of bankruptcy, in the future assignees of his commissioners, whether they be goods in actual possession, or debts, contracts, and other choses in action; and the commissioners by their warrant may cause any house or tenement of the bankrupt to be broke open, in order to enter upon and seize the same. And when the assignees are chosen or approved by the creditors, the commissioners are to assign every thing over to them; and the property of every part of the estate is thereby as fully vested in them as it was in the bankrupt himself, and they have the same remedies to recover it.

The property vested in the assignees is the whole that the bankrupt had in himself, at the time he committed the first act of bankruptcy, or that has been vested in him since, before his debts are satisfied or agreed for. Therefore it is usually said, that once a bankrupt, and always a bankrupt: by which is meant, that a plain direct act of bankruptcy once committed, cannot be purged, or explained away, by any subse-

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quent conduct, as a dubious equivocal act may be; but that, if a commission is afterwards awarded, the commission and the property of the assignees shall have a relation, or reference, back to the first and original act of bankruptcy. Inasmuch that all transactions of the bankrupt are from that time absolutely null and void, either with regard to the alienation of his property, or the receipt of his debts from such as are privy to his bankruptcy; for they are no longer his property, or his debts, but those of the future assignees. And if an execution be sued out, but not served and executed on the bankrupt's effects till after the act of bankruptcy, it is void, as against the assignees. But the king is not bound by this fictitious relation, nor is within the statutes of bankrupts; for if, after the act of bankruptcy committed, and before the assignment of his effects, and extent issues for the debt of the crown, the goods are bound thereby. In France this doctrine of relation is carried to a very great length; for there, every act of a merchant, for 10 days precedent to the act of bankruptcy, is presumed to be fraudulent, and is therefore void. But with us the law stands upon a more reasonable footing: for as these acts of bankruptcy may sometimes be secret to all but a few, and it would be prejudicial to trade to carry this notion to its utmost length, it is provided by stat. 19 Geo. II. c. 32. that no money paid by a bankrupt to a *bona fide*, or real, creditor, in a course of trade, even after an act of bankruptcy done, shall be liable to be refunded. Nor by stat. 1 Jac. I. c. 15. shall any debtor of a bankrupt that pays him his debt without knowing of his bankruptcy, be liable to account for it again. The intention of this relative power being only to reach fraudulent transactions, and not to distress the fair trader.

The assignees may pursue any legal method of recovering this property so vested in them by their own authority; but cannot commence a suit in equity, nor compound any debts owing to the bankrupt, nor refer any matters to arbitration, without the consent of the creditors, or the major part of them in value, at a meeting to be held in pursuance of notice in the gazette.

When they have got in all the effects they can reasonably hope for, and reduced them to ready money, the assignees must, within 12 months after the commission issued, give 21 days notice to the creditors of a meeting for a dividend or distribution; at which time they must produce their accounts, and verify them upon oath, if required. And then the commissioners shall direct a dividend to be made, at so much in the pound, to all creditors who have before proved, or shall then prove, their debts. This dividend must be made equally, and in a rateable proportion, to all the creditors, according to the quantity of their debts; no regard being had to the quality of them. Mortgages, indeed, for which the creditor has a real security in his own hands, are entirely safe; for the commission of bankrupt reaches only the equity of redemption. So are all personal debts, where the creditor has a chattel in his hands, or a pledge or pawn, for the payment, or has taken the debtor's lands or goods in execution. And, upon the equity of the stat. 8 An. c. 14. (which directs, that upon all executions of goods being on any premises demised to a tenant,

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nant, one year's rent and no more shall, if due, be paid to the landlord) it hath also been held, that under a commission of bankrupt, which is in the nature of a statute execution, the landlord shall be allowed his arrears of rent to the same amount, in preference to other creditors, even though he hath neglected to distrein while the goods remained on the premises: which he is otherwise intitled to do for his entire rent, be the quantum what it may. But otherwise judgments and recognizances (both which are debts of record, and therefore at other times have a priority), and also bonds and obligations by deed or special instrument (which are called debts by specialty, and are usually the next in order), these are all put on a level with debts by mere simple contract, and all paid *pari passu*. Nay, so far is this matter carried, that, by the express provision of the statutes, debts not due at the time of the dividend made, as bonds or notes of hand, payable at a future day, shall be paid equally with the rest, allowing a discount or drawback in proportion. And insurances, and obligations upon bottomry or respondentia, *bona fide*, made by the bankrupt, though forfeited after the commission is awarded, shall be looked upon in the same light as debts contracted before any act of bankruptcy.

Within 18 months after the commission issued a second and final dividend shall be made, unless all the effects were exhausted by the first. And if any surplus remains, after paying every creditor his full debt, it shall be restored to the bankrupt. This is a case which sometimes happens to men in trade, who involuntarily, or at least unwarily, commit acts of bankruptcy, by absconding and the like, while their effects are more than sufficient to pay their creditors. And if any suspicious or malevolent creditor will take the advantage of such acts, and sue out a commission, the bankrupt has no remedy, but must quietly submit to the effects of his own imprudence: except that, upon satisfaction made to all the creditors, the commission may be superseded. This case may also happen when a knave is desirous of defrauding his creditors, and is compelled, by a commission, to do them that justice which otherwise he wanted to evade. And therefore, though the usual rule is, that all interest on debts carrying interest shall cease from the time of issuing the commission, yet in case of a surplus left after payment of every debt, such interest shall again revive, and be chargeable on the bankrupt or his representatives.

Commission of Lunacy, issues out of the court of chancery, whether a person represented to be a lunatic, be so or not. See LUNACY.

Commission of Teinds, a court at Edinburgh, which came in place of a committee of the Scottish parliament, for erecting new parishes, and valuing teinds for the support of the clergy. It is vested in the Lords of session. See LAW, n^o clx. 11.

Commission-officers. See OFFICERS.

Commission, in commerce. See FACTORAGE.

COMMISSIONER, a person authorised by commission, letters patent, or other lawful warrant, to examine any matters, or execute any lawful commission.

COMMISSIONER in the General Assembly of the church of Scotland. See ASSEMBLY (General).

Commissioners of the Customs. See CUSTOMS.

Commissioners of Excise. See EXCISE.

Commissioners of the Navy. See NAVY.

Lords Commissioners of the Treasury. See TREASURY and EXCHEQUER.

COMMISSURE, a term used by some authors, for the small metuses or interstices of bodies; or the little clefts between the particles; especially when those particles are broadish and flat, and lie contiguous to one another, like thin plates or lamellæ. The word literally signifies a joining, or connecting of one thing to another.

COMMISSURE, in architecture, &c. denotes the joint of two stones, or the application of the surface of the one to that of the other. See MASONRY.

Among anatomists, commissure is sometimes also used for a suture of the cranium or skull. See SUTURE.

COMMITMENT, in criminal law, is the sending to prison a person who hath been guilty of any crime. This takes place where the offence is not bailable, or the party cannot find BAIL; must be by proper warrant, containing the cause of the commitment; and continues till put an end to by the course of law (see TRIAL); imprisonment being intended only for safe custody, and not for punishment (See ARRESTMENT and BAIL). In this dubious interval between the commitment and trial, a prisoner ought to be used with the utmost humanity; and neither be loaded with needless fetters or subjected to other hardships than such as are absolutely requisite for the purpose of confinement only: though what are so requisite must too often be left to the discretion of the gaolers; who are frequently a merciless race of men, and, by being conversant in scenes of misery, steeld against any tender sensation.

COMMITTEE, one or more persons to whom the consideration or ordering of a matter is referred, either by some court, or by the consent of parties to whom it belongs.

Committee of Parliament, a certain number of members appointed by the house for the examination of a bill, making a report of an inquiry, process of the house, &c. See PARLIAMENT.

Sometimes the whole house is resolved into a committee; on which occasion each person has a right to speak and reply as much and as often as he pleases: an expedient they usually have recourse to in extraordinary cases, and where any thing is to be thoroughly canvassed. When the house is not in a committee, each gives his opinion regularly, and is only allowed to speak once, unless to explain himself.

The standing committees, appointed by every new parliament, are those of privileges and elections of religion, of grievances, of courts of justice, and of trade; though only the former act.

COMMIXTION, in Scots law, is a method of acquiring property, by mixing or blending together different substances belonging to different proprietors. See LAW, Part III. N^o clxii. 8.

COMMODATE, **COMMODATUM**, in the civil jurisprudence, the loan or free concession of any thing moveable or immoveable, for a certain time, on condition

Commis-
sioner
||
Commo-
date.

Commodi-
anus
Common. dition of restoring again the same individual after a certain term. The commodate is a kind of loan; there is this difference, however, between a loan and a commodate, that the latter is gratis, and does not transfer the property: the thing must be returned in essence, and without impairment: so that things which consume by use or time cannot be objects of a commodate, but of a loan; in regard they may be returned in kind, though not in identity. See LAW, Part III. N^o clxxiii. 8.

COMMODIANUS (Gazeus), a Christian author in the 4th century, who wrote a work in Latin verse, intitled Instructions; the moral of which is excellent, but the verse extremely heavy. M. Davies published a fine edition of it in 1711, at the end of Municius Felix.

COMMODITY, in a general sense, denotes all sorts of wares and merchandizes whatsoever that a person deals or trades in.

Staple Commodities, such wares and merchandizes as are commonly and readily sold in a market or exported abroad; being for the most part the proper produce or manufacture of the country.

COMMODORE, a general officer in the British marine, invested with the command of a detachment of ships of war destined on any particular enterprise, during which time he bears the rank of brigadier-general in the army, and is distinguished from the inferior ships of his squadron by a broad red pendant tapering towards the outer end, and sometimes forked. The word is corrupted from the Spanish, *comendador*.

COMMODORE is also a name given to some select ship in a fleet of merchantmen, who leads the van in time of war, and carries a light in his top to conduct the rest, and keep them together. He is always the oldest captain in the fleet he commands.

COMMODUS (L. Aurelius Antoninus), son of M. Antoninus, succeeded his father in the Roman empire. He was naturally cruel and fond of indulging his licentious propensities. He wished to be called Hercules; and, like that hero, he adorned his shoulders with a lion's skin, and armed his hand with a knotted club. He publicly fought with the gladiators, and boasted of his dexterity in killing the wild beasts in the amphitheatre. He required divine honours from the senate, and they were granted. He was wont to put such an immense quantity of gold dust in his hair, that when he appeared bare-headed in the sunshine, his head glittered as if surrounded with sun-beams. Martia, one of his concubines, whose death he had prepared, poisoned him; but as the poison did not quickly operate, he was strangled by a wrestler. He died in the 31st year of his age, and the 13th of his reign. It has been observed, that he never trusted himself to a barber; but always burnt his beard, in imitation of the tyrant Dionysius. A. D. 192.

COMMON, COMMUNIS, something that belongs to all alike; is owned or allowed by all; and not confined to this more than that. In which sense, *common* stands

opposed to *proper*, *peculiar*, &c. Thus, the earth is said to be our *common* mother; in the first or golden age all things were in *common*, as well as the sun and elements: the name animal is *common* to man and beast; that of substance to body and spirit.

COMMON, *Communia*, (i. e. *quod ad omnes pertinet*), in law, signifies that soil, the use whereof is common to a particular town or lordship; or it is a profit that a man hath in the land of another person, usually in common with others; or a right which a person hath to put his cattle to pasture into ground that is not his own. And there is not only common of pasture, but also common of piscary, common of estovers, common of turbary, &c. And in all cases of common, the law doth much respect the custom of the place; for there the rule is, *consuetudo loci est observanda*. See COMMONTY.

COMMON Council, See COUNCIL.

COMMON Law, that body of law received as rules in these kingdoms, before any statute was enacted in parliament to alter the same. See LAW, Part II. n^o 36.

COMMON-PLACE Book, is a register of what things occur, worthy to be noted, in the course of a man's thinking or study, so disposed as that among a number of subjects any one may be easily found. The advantages of making a common-place book are many: it not only makes a man read with accuracy and attention, but induces him insensibly to think for himself, provided he considers it not so much as a register of sentiments that strike him in the course of reading, but as a register of his own thoughts upon various subjects. Many valuable thoughts occur even to men of no extraordinary genius. These, without the assistance of a common-place book, are generally lost both to himself and others. There are various methods of arranging common-place books; that of Mr Locke is as good as any that have hitherto been contrived.

The first page of the book you intend to take down their common-place in, is to serve as a kind of index to the whole, and to contain references to every place or matter therein: in the commodious contrivance of which index, so as it may admit of a sufficient copia or variety of materials, without any confusion, all the secret of the method consists.

In order to this, the first page, as already mentioned, or, for more room, the two first pages that front each other, are to be divided by parallel lines, into 25 equal parts; whereof every fifth line is to be distinguished by its colour or other circumstance. These lines are to be cut perpendicularly by others, drawn from top to bottom; and in the several spaces thereof, the several letters of the alphabet, both capital and minuscule, are to be duly wrote.

The form of the lines and divisions, both horizontal and perpendicular, with the manner of writing the letters therein, will be conceived from the following specimen; wherein, what is to be done in the book for all the letters of the alphabet, is here shown in the first four, *A*, *B*, *C*, and *D*.

Common.

A	a
	e
	i
	o
	u
B	a
	e 2, 3.
	i
	o
	u

C	a
	e
	i
	o
	u
D	a
	e
	i
	o
	u

Common,
Commonal-
ty.

The index of the common-place book thus formed, matters are ready for the taking down any thing therein.

In order to this, consider to what head the thing you would enter is most naturally referred; and under which one would be led to look for such a thing: in this head, or word, regard is had to the initial letter, and the first vowel that follows it; which are the characteristic letters whereon all the use of the index depends.

Suppose (*e. gr.*) I would enter down a passage that refers to the head *beauty*. *B*, I consider, is the initial letter, and *e* the first vowel: then, looking upon the index for the partition *B*, and therein the line *e* (which is the place for all words whose first letter is *b*, and first vowel *e*; as *beauty*, *beneficence*, *bread*, *breeding*, *blemishes*), and finding no numbers already down to direct me to any page of the book where words of this characteristic have been entered, I turn forward to the first blank page I find (which, in a fresh book, as this is supposed to be, will be page 2d), and here write what I have occasion for on the head *beauty*; beginning the head in the margin, and indenting all the other subservient lines, that the head may stand out and show itself: this done, I enter the page where it is wrote, *viz.* 2, in the index in the space *Be*; from which time, the class *be* becomes wholly in possession of the 2d and 3d pages, which are consigned to letters of this characteristic.

Had I found any page or number already entered in the space *Be*, I must have turned to the page, and have wrote my matter in what room was left therein: so, if after entering the passage on *beauty*, I should have occasion for *benevolence*, or the like, finding the number 2 already possessed of the space of this characteristic, I begin the passage on *benevolence* in the remainder of the page; which not containing the whole, I carry it on to page 3d, which is also for *be*; and add the number 3 in the index.

COMMON Pleas is one of the king's courts now held constantly in Westminster-hall, but in former times was moveable.

All civil causes, as well real as personal, are, or were formerly, tried in this court, according to the strict law of the land. In personal and mixed actions it has a concurrent jurisdiction with the king's bench, but has no cognizance of pleas of the crown. The actions belonging to the court of common-pleas come thither by original, as arrests and outlawries; or by privilege, or attachment for or against privileged persons; or out of inferior courts, not of record, by *pone*, *recordari*, *accedas ad curiam*, writ of false judgment, &c.

The chief judge of this court is called *lord chief justice of the common pleas*, who is assisted by three other judges. The other officers of the court are the *custos brevium*, who is the chief clerk; three prothonotaries, and their secondaries; the clerk of the warrants, clerk of the effoins, 14 filazers, 4 exigentors, a clerk of the juries, the chirographer, the clerk of the king's silver, clerk of the treasury, clerk of the seal, clerk of the outlawries, clerk of the inrolment of fines and recoveries, and clerk of the errors.

COMMON-Prayer is the liturgy in the church of England: (See *LITURGY*.) Clergymen are to use the public form of prayers prescribed by the Book of Common Prayer: and refusing to do so, or using any other public prayers, are punishable by stat. 1 Eliz. c. ii.

COMMON, in grammar, denotes the gender of nouns which are equally applicable to both sexes: thus, *parens* "a parent," is of the common gender.

COMMON, in geometry, is applied to an angle, line, or the like, which belongs equally to two figures.

COMMON Divisor, a quantity or number which exactly divides two or more other quantities or numbers, without leaving any remainder.

COMMONALTY, the lower of the two divisions of the civil state. See *CIVIL State*.

The commonalty, like the nobility, are divided into several degrees: and as the lords, though different in rank, yet all of them are peers in respect of their nobility; so the commoners, though some are greatly superior to others, yet all are in law commonalty, in respect of their want of nobility.

1. The first name of dignity next beneath a peer was anciently that of *vidames*, *vice-domini*, or *valvasors*: who are mentioned by our ancient lawyers as *virī magnæ dignitatis*; and Sir Edward Coke speaks highly of them. Yet they are now quite out of use; and our legal antiquarians are not agreed upon even their original or ancient office.

2. Now, therefore, the first personal dignity after the nobility is a knight of the order of St George, or of the garter, first instituted by Edw. III. A. D. 1344.

3. Next (but not till after certain official dignities, as privy-counsellors, the chancellors of the exchequer and duchy of Lancaster, the chief justice of the king's bench, the master of the rolls, and the other English judges), follows a *knight banneret*; who indeed, by statutes 5 Richard II. stat. 2. c. 4. and 14 Richard II. c. 11. is ranked next after barons; and his precedence before the younger sons of viscounts was confirmed to him by order of King James I. in the tenth year of his reign. But in order to intitle him to this rank, he must have been created by the king in person, in the field.

Commonal field, under the royal banners, in time of open war; else he ranks after
Commoner.

4. *Baronets*; who are the next in order: which title is a dignity of inheritance, created by letters patent, and usually descendible to the issue-male. See **BARONETS**.

5. Next follow *knights of the Bath*. See **BATH**.

6. The last of these inferior nobility are *knights bachelor*; the most ancient, though the lowest, order of knighthood amongst us. See **BACHELOR**.

7. The above, with those enumerated under the article **NOBILITY**, Sir Edward Coke says, are all the names of *dignity* in this kingdom; *esquires* and *gentlemen* being only names of *worship*. But before these last the heralds rank all colonels, serjeants at law, and doctors in the three learned professions.

8. *Esquires* and *gentlemen* are confounded together by Sir Edward Coke; who observes, that every esquire is a gentleman, and a gentleman is defined to be one *qui arma gerit*, "who bears coat-armour;" the grant of which adds gentility to a man's family: in like manner as civil nobility among the Romans was founded in the *jus imaginum*, or having the image of one ancestor at least who had borne some curule office. It is indeed a matter somewhat unsettled what constitutes the distinction, or who is a real esquire; for it is not an estate, however large, that confers this rank upon its owner. Camden, who was himself a herald, distinguishes them the most accurately; and he reckons up four sorts of them: 1st, The eldest sons of knights, and their eldest sons, in perpetual succession. 2dly, The eldest sons of younger sons of peers, and their eldest sons, in like perpetual succession: both which species of esquires Sir Henry Spelman intitles *armigeri natalitii*. 3dly, Esquires created by the king's letters patent, or other investiture; and their eldest sons. 4thly, Esquires by virtue of their office; as justices of the peace and others who bear any office of trust under the crown. To these may be added the esquires of the knights of the bath, each of whom constitutes three at his installation; and all foreign, nay, Irish peers; for not only these, but the eldest sons of peers of Great Britain, though frequently titular lords, are only esquires in the law, and must be so named in all legal proceedings.

9. As for *gentlemen*, says Sir Thomas Smith, they be made good cheap in this kingdom: for whosoever studieth the laws of the realm, who studieth in the universities, who professeth liberal sciences, and (to be short) who can live idly and without manual labour, and will bear the part, charge, and countenance of a gentleman, he shall be called master, and shall be taken for a gentleman.

10. A *yeoman* is he that hath free land of 40s. by the year; who is thereby qualified to serve on juries. vote for knights of the shire, and do any other act where the law requires one that is *probus et legalis homo*.

11. The rest of the commonalty are *tradesmen*, *artificers*, and *labourers*; who (as well as all others) must, in pursuance of the statute 1 Henry V. c. 5. be styled by the name and addition of their estate, degree, or mystery, in all actions and other legal proceedings.

COMMONER, or **GENTLEMAN-COMMONER**, in the universities, a student entered in a certain rank.

COMMONS, or **HOUSE OF COMMONS**, a denomination given to the lower house of parliament. See **PARLIAMENT**. Commons, Commonty.

The commons consist of all such men of any property in the kingdom as have not seats in the house of lords, every one of whom has a voice in parliament, either personally or by his representatives. In a free state, every man, who is supposed a free agent, ought to be in some measure his own governor; and therefore a branch at least of the legislative power should reside in the whole body of the people. And this power, when the territories of the state are small, and its citizens easily known, should be exercised by the people in their aggregate or collective capacity, as was wisely ordained in the petty republics of Greece, and the first rudiments of the Roman state. But this will be highly inconvenient when the public territory is extended to any considerable degree, and the number of citizens is increased. Thus when, after the social war, all the burghers of Italy were admitted free citizens of Rome, and each had a vote in the public assemblies, it became impossible to distinguish the spurious from the real voter, and from that time all elections and popular deliberations grew tumultuous and disorderly; which paved the way for Marius and Sylla, Pompey and Cæsar, to trample on the liberties of their country, and at last to dissolve the commonwealth. In so large a state as ours, therefore, it is very wisely contrived, that the people should do that by their representatives which it is impracticable to perform in person; representatives chosen by a number of minute and separate districts, wherein all the voters are or may be easily distinguished. The counties are therefore represented by knights, elected by the proprietors of lands; the cities and boroughs are represented by citizens and burghesses, chosen by the mercantile or supposed trading interest of the nation; much in the same manner as the burghers in the diet of Sweden are chosen by the corporate towns, Stockholm sending four, as London does with us, other cities two, and some only one. The number of English representatives is 513, of Scots 45; in all 558; and every member, though chosen by one particular district, when elected and returned, serves for the whole realm: for the end of his coming thither is not particular, but general; not barely to advantage his constituents, but the commonwealth; to advise his majesty, as appears from the writ of summons, "*de communi consilio super negotiis quibusdam arduis et urgentibus, regem, statum, et defensionem regni Angliæ et ecclesiæ Anglicanæ concernentibus.*" And therefore he is not bound, like a deputy in the United Provinces, to consult with, or take the advice of, his constituents upon any particular point, unless he himself thinks it proper or prudent so to do.

The peculiar laws and customs of the house of commons relate principally to the raising of taxes, and the elections of members to serve in parliament. See **TAXES** and **ELECTIONS**.

Doctors Commons. See **COLLEGE of Civilians**.

Proctor of the Commons. See **PROCTOR**.

COMMONTY, in Scots law, sometimes signifies lands belonging to two or more common proprietors; sometimes a heath or muir though it should be-

Common-
wealth
||
Communi-
on.

long in property to one, if there has been a promiscuous possession upon it by pasturage; and the act 1695, mentions commonities belonging in property to the king and to royal boroughs. See LAW, Part III. N^o clxxv. 16.

COMMONWEALTH. See REPUBLIC.

COMMOTE, an ancient term in Wales, denoting half a cantred, or hundred; containing 50 villages. See HUNDRED. Wales was anciently divided into three provinces; each of these subdivided into cantreds, and every cantred into two commotes or hundreds. Silvester Girald, however, tells us in his itinerary, that a commote is but a quarter of a hundred.

COMMUNES, in botany, the name of a class in Linnæus's *methodis Calycina*, consisting of two plants which, like teazel and dandelion, have a calyx or flower-cup common to many flowers or florets. These are the aggregate or compound flowers of other systems.

COMMUNIBUS LOCIS, a Latin term, in frequent use among philosophical, &c. writers; implying some medium, or mean relation, between several places. Dr Keil supposes the ocean to be one quarter of a mile deep, *communibus locis*, *q. d.* at a medium, or taking one place with another.

COMMUNIBUS Annis, has the same import with regard to years, that *communibus locis* has with regard to places. Mr Derham observes that the depth of rain, *communibus annis*, or one year with another, were it to stagnate on the earth, would amount in Townley in Lancashire, to $42\frac{1}{2}$ inches; at Upminster in Essex, to $19\frac{1}{4}$; at Zurich, $32\frac{1}{4}$; at Pisa, $43\frac{1}{4}$; and at Paris to 19 inches.

COMMUNICATING, in theology, the act of receiving the sacrament of the eucharist. Those of the reformed, and of the Greek church, communicate under both kinds; those of the Romish, under only one. The oriental communicants receive the species of wine by a spoon, and anciently they sucked it through a pipe, as has been observed by Beat. Rheanus on Tertullian.

COMMUNICATION, in a general sense, the act of imparting something to another.

COMMUNICATION is also used for the connection of one thing with another, or the passage from one place to another: thus a gallery is a communication between two apartments.

COMMUNICATION of motion, the act whereby a body at rest is put into motion by a moving body; or, it is the acceleration of motion in a body already moving.

Lines of COMMUNICATION, in military matters, trenches made to continue and preserve a safe correspondence between two forts or posts; or at a siege, between two approaches, that they may relieve one another.

Canal of COMMUNICATION. See CANAL.

COMMUNION, in matters of religion, the being united in doctrine and discipline; in which sense of the word, different churches are said to hold communion with each other.

In the primitive Christian church, every bishop was obliged, after his ordination, to send circular letters to foreign churches, to signify that he was in communion with them. The three grand communions into which the Christian church is at present divided, is

that of the church of Rome, the Greek church, and the Protestant church: but originally all Christians were in communion with each other, having one common faith and discipline.

COMMUNION is also used for the act of communicating the sacrament of the eucharist, or the Lord's supper.

The fourth council of Lateran decrees, that every believer shall receive the communion, at least, at Easter; which seems to import a tacit desire, that they should do it oftener; as, in effect, they did it much oftener in the primitive days. Gratian, and the master of the sentences, prescribe it as a rule for the laity, to communicate three times a-year, at Easter, Whitsuntide, and Christmas. But in the 13th century, the practice was got on foot, never to approach the eucharist except at Easter; and the council thought fit to enjoin it then by a law, lest their coldness and remissness should go farther still. And the council of Trent renewed the same injunction, and recommended frequent communion without enforcing it by an express decree.

In the ninth century, the communion was still received by the laity in both kinds; or, rather, the species of bread was dipped in the wine, as is owned by the Romanists themselves. (Acta SS. Benedict. Sæc. III.) M. de Marca observes, that they received it at first in their hands, Hist. de Bearn. and believes the communion under one kind alone to have had its rise in the West under pope Urban II. in 1096, at the time of the conquest of the Holy Land. And it was more solemnly enjoined by the council of Constance in 1414. The twenty-eighth canon of the council of Clermont enjoins the communion to be received under both kinds, distinctly; adding, however, two exceptions; the one of necessity, the other of caution, *nisi per necessitatem & cautelam*; the first in favour of the sick, the second of the abstemious, or those who had an aversion for wine.

It was formerly a kind of canonical punishment, for clerks guilty of any crime, to be reduced to *lay communion*, i. e. only to receive it as the laity did, viz. under one kind.

They had another punishment of the same nature, though under a different name, called *foreign communion*; to which the canons frequently condemned their bishops and other clerks. This punishment was not any excommunication, or deposition; but a kind of suspension from the function of the order, and a degradation from the rank they held in the church. It had its name because the communion was only granted to the criminal on the foot of a foreign clerk, i. e. being reduced to the lowest of his order, he took place after all those of his rank, as all clerks, &c. did in the churches to which they did not belong. The second council of Agda orders every clerk that absents himself from the church to be reduced to foreign communion.

COMMUNION Service, in the liturgy of the church of England, the office for the administration of the holy sacrament, extracted from several ancient liturgies, as those of St Basil, St Ambrose, &c.

By the last rubric, part of this service is appointed to be read every Sunday and holyday, after the morning prayer, even though there be no communicants.

COM.

Comm-
nity
||
Compa-
nion.

COMMUNITY, denotes a society of men living in the same place, under the same laws, the same regulations, and the same customs.

COMMUTATION, in law, the change of a penalty or punishment from a greater to a less; as when death is commuted for banishment, &c.

COMNENA (Ann) daughter of Alexus Comnenus emperor of the East; memorable for her great learning and virtue, and for her History of the life and actions of her father, which is highly esteemed. She flourished about the year 1117. The history, which is in 15 books, was first published very imperfectly by Heschelius in 1610; and afterwards printed in the collection of the Byzantine historians, with a diffuse and incorrect Latin version by the Jesuit Possinus, but with excellent notes by the learned Du Fresne.

COMO, a strong and populous town of Italy, in the duchy of Milan, and in the Comasco, with a bishop's see. It was taken by the Imperialists in 1706, and is seated on a lake of the same name in E. Long. 8. 57. N. Lat. 45. 45.

Como, the lake so called, is the largest in Italy. It is situated in the duchy of Milan in the Comasco, on the confines of Swisserland and the Grisons. It is 88 miles in circumference, yet is not above 6 miles over in any part.

COMORA islands, lie between the north end of the island of Madagascar and the coast of Zanguebar, from 10 to 15 degrees south latitude. Authors differ greatly with regard to their number, some speaking of three, others of five, and some of eight of these islands. They all abound in horned cattle, sheep, hogs, and a variety of fruits common in warm countries. They are said also to produce a kind of rice which turns of a violet colour when boiled. The most remarkable of them, and which the Europeans are best acquainted with, is the island of Johanna. See that article.

COMORIN, or **CAPE COMORIN**, the most southerly promontory of the Hither India, lying north-west of the island of Ceylon.

COMORRA, a handsome and large town of Lower Hungary, and capital of a territory of the same name. It is so well fortified, that the Turks could never take it. The greatest part of the inhabitants are Hungarians or Russians, who are very rich, and are of the Greek religion. It is seated on the river Danube, in the island of Sihut. E. Long. 18. 25. N. Lat. 47. 50.

COMOSÆ, in botany, from *Coma*. An order of plants in the former editions of Linnæus's Fragments of a Natural Method, consisting of the spiked willow or *spiræa frutex*, dropwort, and greater meadow-sweet. These, though formerly distinct genera, are by Linnæus collected into one, under the name of *spiræa*. The flowers growing in a head, resemble a bush, or tuft of hair, which probably gave rise to the epithet *Comosa*.

COMPACT, in philosophy, is said of bodies which are of a close, dense, and heavy texture, with few pores, and those very small.

COMPACT, in a legal sense, signifies an agreement or contract stipulated between several parties.

COMPANION, one with whom a man frequently converses.

Compa-
nion.

As the human mind cannot always be on the stretch, nor the hands always employed in labour, recreation becomes both agreeable and necessary. Of all recreations, that of the company of a few chosen companions must be allowed to be the most manly and most improving: but as in those hours of recreation we are most in danger of being misled, being generally at such seasons more off our guard than usual, the greatest care should be taken in making choice of which to associate with; for according to our choice of them, both our character and disposition will receive a tincture, as waters passing through minerals partake of their taste and efficacy. This is a truth so universally received, that it is become a proverb both in the natural and moral world, That a man is known by his company. As by chemistry we learn, that discordant mixtures produce nothing but broil and fermentation till one of them gets the ascendancy of the rest; so from scripture we learn, that two cannot walk together except they be agreed. From which we may see, how impossible it is for any one to be thought a person of real goodness and integrity, whilst he chooseth for his companions the abandoned and licentious.

By herding with such, he will not only lose his character, but his virtue; for whatever fallacious distinction he may be pleased to make between the men and their vices, in the end the first generally qualifies the last; and by ceasing to hate them he will soon learn both to love and practise them. In short, the society of sensual men is peculiarly ensnaring. The malignity of their contagion doth not appear all at once. Their frolics first appear harmless; then, when partaken of, they leave a longing relish behind them; and one appointment makes way for another, one expence leads on to a second; and so time and fortune are wasted away to very bad purpose. Then one appetite craves, and another must be gratified, till all become too importunate to be denied; which verified what the wisest of men long since said, "That the beginning of sin is like the breaking forth of waters, which when it once maketh an entrance, carrieth all before it with rushing impetuosity." Some pangs of remorse may be felt by the infatuated creature on his first degeneracy, and some faint resolutions against being seduced any more; which will no sooner be discovered by those leaders to destruction, but all arts will be used to allure him back to bear them company in the broad beaten path to ruin. Of all which methods, none is more to be dreaded than raillery; for this is generally exercised with all its force, and too often proves fatal. Another method used to mislead the young novice not yet hackneyed in vice, and no less dangerous than the other, is to call evil good, and good evil. Lust and sensuality must pass for love and gallantry; revenge and malice, for heroism. But steadiness should be shown, by holding such pests of society in derision, and looking on them with contempt; by appearing unmoved by their ill founded banters, and unflung by their impious jests.

Upon the whole, in order to escape the danger which attends the keeping of evil company, let those you associate with be persons as carefully educated and as honestly disposed as yourself; of a good moral character, not given to any known vice; whose lives are temperate, and whose expences are moderate: with such

Company. Such company as these, you will neither get discredit, nor degenerate into excess. You will be a mutual check to each other; and your reputation will be so established, that it will be the ambition of others to be admitted members of your society. Select those for your companions who are men of good sense and understanding; and, if possible, who excel in some art, science, or accomplishment; that so, in the course of your acquaintance, your very hours of amusement may contribute to your improvement; and for the most part such are open and communicative, and take as much pleasure in being heard as you to be informed. By pursuing such a conduct, you will be an ornament and useful member of society.

COMPANY, a collective term, understood of several persons assembled together in the same place, or with the same design. The word is formed of the French *compagnie*, and that of *companion*, or *companies*, which, Chifflet observes, are found in the Salic law, tit. 66. and are properly military words, understood of soldiers, who, according to the modern phrase, are comrades or mess-mates, *i. e.* lodge together, eat together, &c. of the Latin *cum* "with", and *panis* "bread." It may be added, that in some Greek authors under the western empire, the word *κοινωνία* occurs in the sense of society.

COMPANY, in a familiar or fashionable sense, is used for an assemblage of persons met for the purpose of conversation, pastime, or festivity.

The love of company and of social pleasures is natural, and attended with some of the sweetest satisfactions of human life; but, like every other love, when it proceeds beyond the limits of moderation, it ceases to produce its natural effect, and terminates in disgustful satiety. The foundation-stone and the pillar on which we build the fabric of our felicity, must be laid in our own hearts. Amusement, mirth, agreeable variety, and even improvement, may be sometimes sought in the gaiety of mixed company, and in the usual diversions of the world; but if we found our general happiness on these, we shall do little more than raise castles in the air, or build houses on the sand.

To derive the proper pleasure and improvement from company, it ought to be select, and to consist of persons of character, respectable both for their morals and their understandings. Mixed and undistinguished society tends only to dissipate our ideas and induce a laxity of principles and practice. The pleasure it affords is of a coarse, mixed, noisy, and rude kind. Indeed, it commonly ends in weariness and disgust, as even they are ready to confess who yet constantly pursue it, as if their chief good consisted in living in a crowd.

Among those, indeed, who are exempted by their circumstances from professional and official employments, and who professedly devote themselves to a life of pleasure, little else seems to constitute the idea of it, but an unceasing succession of company, public or private. The dress, and other circumstances preparatory to the enjoyment of this pleasure, scarcely leave a moment for reflection. Day after day is spent in the same toilsome round, till a habit is formed, which renders dissipation necessary to existence. One week without it would probably induce a lowness of spirits, which might termi-

nate in despair and suicide. When the mind has no *Company*, anchor, it will suffer a kind of shipwreck; it will sink in whirlpools, and be dashed on rocks. What, indeed, is life or its enjoyments without settled principles, laudable purposes, mental exertions, and internal comfort? It is merely a vapour, or, to drop the language of figure on so serious a subject, it is a state worse than non-entity, since it possesses a restless power of action, productive of nothing but misery.

It is recommended, therefore, to all who wish to enjoy their existence (and who entertains not that wish?) that they should acquire a power not only of bearing, but of taking a pleasure in, temporary solitude. Every one must, indeed, sometimes be alone. Let him not repine when he is alone, but learn to set a value on the golden moments. It is then that he is enabled to study himself and the world around him. It is then that he has an opportunity of seeing things as they are, and of removing the deceitful veil, which almost every thing assumes in the busy scene of worldly employments. The soul is enabled to retire into herself, and to exert those energies which are always attended with sublime pleasure. She is enabled to see the dependent, frail, and wretched state of man as the child of nature; and incited by her discovery, to implore grace and protection from the Lord of the universe. They, indeed, who fly from solitude, can seldom be religious; for religion requires meditation. They may be said to "live without God in the world; not, it is true, from atheistical principles, but from a carelessness of disposition; a truly deplorable state, the consciousness of which could not fail to cloud the gaiety of those halcyon beings who sport in the sunshine of unremitted pleasure.

There is no doubt but that man is made for action, and that his duties and pleasures are often most numerous and most important amidst the busy hum of men. Many vices, and many corrupt dispositions, have been fostered in a solitary life. Monks are not favourable to human nature or human happiness; but neither is unlimited dissipation.

In short, let there be a sweet interchange of retirement and association, of repose and activity. A few hours spent every day by the votaries of pleasure in serious meditation, would render their pleasure pure, and more unmixed with misery. It would give him knowledge, so that they would see how far they might advance in their pursuit without danger; and resolution, so that they might retreat when danger approached. It would teach them how to live, a knowledge which indeed they think they possess already; and it would also teach them, what they are often too little solicitous to learn, how to die.

COMPANY, in a commercial sense, is a society of merchants, mechanics, or other traders, joined together in one common interest.

When there are only two or three joined in this manner, it is called a partnership; the term *company* being restrained to societies consisting of a considerable number of members, associated together by a charter obtained from the prince.

The mechanics of all corporations, or towns incorporated, are thus erected into companies, which have charters of privileges and large immunities.

COMPANY seems more particularly appropriated to these

Company. those grand associations set on foot for the commerce of the remote parts of the world, and vested by charter with peculiar privileges.

When companies do not trade upon a joint stock, but are obliged to admit any person, properly qualified, upon paying a certain fine and agreeing to submit to the regulation of the company, each member trading upon his own stock and at his own risk, they are called *Regulated Companies*. When they trade upon a joint stock, each member sharing in the common profit or loss in proportion to his share in this stock, they are called *Joint-stock Companies*. Such companies, whether regulated or joint-stock, sometimes have, and sometimes have not, exclusive privileges.

However injurious companies with joint-stock, and incorporated with exclusive privileges, may at this time be reckoned to the nation in general, it is yet certain that they were the general parent of all our foreign commerce; private traders being discouraged from hazarding their fortunes in foreign countries, until the method of traffic had been first settled by joint-stock companies. But since the trade of this kingdom and the number of traders have increased, and the methods of assurance of shipping and merchandize, and the navigation to all parts of the known world have become familiar to us, these companies, in the opinion of most men, have been looked upon in the light of monopolies; their privileges have therefore been lessened from time to time, in order to favour a free and general trade: and experience has shown, that the trade of the nation has advanced in proportion as monopolies have been discouraged. In short, as all restrictions of trade are found to be hurtful, nothing can be more evident, than that no company whatsoever, whether they trade in a joint-stock or only under regulation, can be for the public good, except it may be easy for all or any of his majesty's subjects to be admitted into all or any of the said companies, at any time, and for a very inconsiderable fine.

I. *REGULATED Companies* resemble, in every respect, the corporations of trades, so common in the cities and towns of all the different countries of Europe; and are a sort of enlarged monopolies of the same kind. As no inhabitant of a town can exercise an incorporated trade, without first obtaining his freedom in the corporation; so in most cases no subject of the state can lawfully carry on any branch of foreign trade, for which a regulated company is established, without first becoming a member of that company. The monopoly is more or less strict according as the terms of admission are more or less difficult; and according as the directors of the company have more or less authority, or have it more or less in their power to manage in such a manner as to confine the greater part of the trade to themselves and their particular friends. In the most ancient regulated companies the privileges of apprenticeship were the same as in other corporations; and intitled the person who had served his time to a member of the company, to become himself a member, either without paying any fine, or upon paying a much smaller one than what was exacted of other people. The usual coporation spirit, wherever the law does not restrain it, prevails in all regulated companies. When they have been allowed to act according to their natural genius, they have always, in or-

der to confine the competition to as small a number of Company. persons as possible, endeavoured to subject the trade to many burdensome regulations. When the law has restrained them from doing this, they have become altogether useless and insignificant.

The regulated companies for foreign commerce, which at present subsist in Great Britain, are, The *Hamburgh Company*, the *Russia Company*, the *Eastland Company*, the *Turkey Company*, and the *African Company*.

1. *The Hamburgh Company* is the oldest trading establishment in the kingdom; though not always known by that name, nor restrained to those narrow bounds under which it is now confined. It was first called the *Company of merchants trading to Calais, Holland Zealand, Brabant, and Flanders*: then it acquired the general title of *Merchant-adventurers of England*: as being composed of all the English merchants who traded to the Low Countries, the Baltic, and the German ocean. Lastly, it was called the *Company of Merchant-adventurers of England trading to Hamburgh*.

This company was first incorporated by Edward I. in 1296; and established again, by charter, in 1406, under the reign of king Henry IV. It was afterwards confirmed, and augmented with divers privileges, by many of his successors. Before the charter of Henry IV. all the English merchants who trafficked out of the realm, were left to their own discretion, and managed their affairs with foreigners as might be most for their respective interests, without any regard to the general commerce of the nation. Henry, observing this disorder, endeavoured to remedy it, by uniting all the merchants in his dominions into one body; wherein, without losing the liberty of trading each for himself, they might be governed by a company still subsisting; and be subject to regulations, which should secure the general interest of the national commerce, without prejudice to the interest of particulars. With this view, he granted all the merchants of his states, particularly those of Calais, then in his hands, a power of associating themselves into a body politic, with directors and governors, both in England and abroad; to hold assemblies, both for the direction of business and the deciding of controversies among merchants; make laws; punish delinquents; and impose moderate duties and taxes on merchandizes, and merchants, to be employed in the service of the corporation. These few articles of the charter of Henry IV. were afterwards much augmented by Henry VII. who first gave them the title of *Merchant-adventurers to Calais, Holland, &c.* gave them a power of proclaiming and continuing free fairs at Calais; and ordered, that to be reputed a member of the society, each person pay twenty marks sterling; and that the several members should attend the general meetings, or courts, appointed by the directors, whether at London, Calais, or elsewhere.

A petition being made to Queen Elizabeth, in 1564, for an explanation of certain articles in the charter of Henry VII. and a confirmation of the rest granted by other kings; that princess, by a charter of the same year, declares that, to end all disputes, they shall be incorporated a new, under the title of the *Company of Merchant-adventurers of England*; that all who were members of the former company should, if they de-

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Company. fired it, be admitted members of this; that they should have a common seal; that they should admit into their society what other persons, and on what terms, they pleased, and expel them again on misbehaviour; that the city of Hamburg and neighbouring cities should be reputed within their grant, together with those of the Low Countries, &c. in that of the former company; that no member should marry out of the kingdom, nor purchase lands, &c. in any city beyond sea; and that those who do, shall be, *ipso facto*, excluded for ever. Twenty-two years after this first charter, Queen Elizabeth granted them a second; confirming the former, and further granting them a privilege of exclusion; with a power of erecting in each city within their grant a standing council.

The revolutions which happened in the Low Countries towards the end of the sixteenth century, and which laid the foundation of the republic of Holland, having hindered the company from continuing their commerce with their ancient freedom; it was obliged to turn it almost wholly to the side of Hamburg, and the cities on the German ocean: from which change, some people took occasion to change its name to that of the *Hamburg Company*; though the ancient title of *Merchant-adventurers* is still retained in all their writings.

About the middle of the last century, the fine for admission was fifty, and at one time one hundred pounds, and the conduct of the company was said to be extremely oppressive. In 1643, in 1645, and in 1661, the clothiers and free traders of the west of England complained of them to parliament, as of monopolists who confined the trade and oppressed the manufactures of the country. Though those complaints produced no act of parliament, they had probably intimidated the company so far, as to oblige them to reform their conduct. The terms of admission are now said to be quite easy; and the directors either have it not in their power to subject the trade to any burdensome restraint or regulations, or at least have not of late exercised that power.

2. *The Russia Company* was first projected towards the end of the reign of King Edward VI. executed in the first and second years of Philip and Mary; but had not its perfection till its charter was confirmed by act of parliament, under Queen Elizabeth, in 1566. It had its rise from certain adventurers, who were sent in three vessels on the discovery of new countries; and to find out a north-east passage to China: these, falling into the White Sea, and making up to the port of Archangel, were exceedingly well received by the Muscovites; and, at their return, solicited letters patent to secure to themselves the commerce of Russia, for which they had formed an association.

By their charter, the association was declared a body politic, under the name of the *Company of Merchant-adventurers of England, for the discovery of lands, territories, islands, &c. unknown, or unfrequented*. Their privileges were, to have a governor, four consuls, and twenty-four assistants, for their commerce; for their policy, to make laws, inflict penalties, send out ships to make discoveries, take possession of them in the king's name, set up the banner royal of England, plant them; and lastly, the exclusive privilege of tra-

ding to Archangel, and other ports of Muscovy, not yet frequented by the English. *Company.*

This charter not being sufficiently guarded, was confirmed by parliament in the eighth year of Queen Elizabeth; wherein it was enacted, that in regard the former name was too long, they should now be called *Company of English Merchants for discovering new trades*; under which name, they should be capable of acquiring and holding all kind of lands, manors, rents, &c. not exceeding a hundred marks, *per ann.* and not held of her majesty; that no part of the continent, island, harbour, &c. not known or frequented before the first enterprize of the merchants of their company, situated to the north, or north-west, or north-east of London; nor any part of the continent, islands, &c. under the obedience of the emperor of Russia, or in the countries of Armenia, Media, Hyrcania, Persia, or the Caspian sea, should be visited by any subjects of England, to exercise any commerce, without the consent of the said company, on pain of confiscation. The said company shall use no ships in her new commerce but those of the nation; nor transport any cloths, serges, or other woollen stuffs, till they have been dyed and pressed. That in case the company discontinue of itself to unload commodities in the road of the abbey of S. Nicolas, in Russia, or some other port, on the north coasts of Russia, for the space of three years, the other subjects of England shall be allowed to traffic to Narva, while the said company discontinues its commerce into Russia, only using English vessels.

This company subsisted with reputation almost a whole century, till the time of the civil wars. It is said, the czar then reigning, hearing of the murder of King Charles I. ordered all the English in his states to be expelled; which the Dutch taking the advantage of, settled in their room. After the Restoration, the remains of the company re-established part of their commerce at Archangel, but never with the same success as before; the Russians being now well accustomed to the Dutch merchants and merchandize.

This company subsists still, under the direction of a governor, four consuls, and assistants. By the 10th and 11th of William III. c. 6. the fine for admission was reduced to L. 5.

3. *The Eastland Company* was incorporated by Queen Elizabeth. Its charter is dated in the year 1579. By the first article the company is erected into a body politic, under the title of the *Company of Merchants of the East*; to consist of Englishmen, all real merchants, who have exercised the business thereof, and trafficked thro' the Sound, before the year 1568, into Norway, Sweden, Poland, Livonia, Prussia, Pomerania, &c. as also Revel, Coningsberg, Dantzick, Copenhagen, &c. excepting Narva, Muscovy, and its dependencies. Most of the following articles grant them the usual prerogatives of such companies; as a seal, governor, courts, laws, &c.

The privileges peculiar to this company are, that none shall be admitted a member who is already a member of any other company; nor any retail-dealer at all. That no merchant qualified be admitted without paying six pounds thirteen shillings and sixpence. That a member of another company, desiring to renounce the privileges thereof, and to be received into that

Company. That of the East shall be admitted *gratis*; provided he procures the same favour for a merchant of the East willing to fill his place. That the merchant-adventurers who never dealt in the East, in the places expressed in the charter, may be received as members of the company on paying forty marks; that, notwithstanding this union of the Adventurers of England with the company of the East, each shall retain its rights and privileges. That they shall export no cloths but what are dyed and pressed, except a hundred pieces *per annum*, which are allowed them *gratis*. This charter was confirmed by Charles II. in 1629, with this addition, that no person, of what quality soever, living in London, should be admitted a member, unless he were free of the city. This company was complained of as a monopoly, and first curtailed by legal authority in 1672; and since the declaration of rights in 1689, exist only in name; but still continue to elect their annual officers, who are a governor, a deputy, and twenty-four assistants.

4. *The Turkey or Levant Company*, had its rise under queen Elizabeth, in 1581. James I. confirmed its charter in 1605, adding new privileges. During the civil wars, there happened some innovations in the government of the company; many persons having been admitted members, not qualified by the charters of queen Elizabeth and king James, or that did not conform to the regulations prescribed. Charles II. upon his restoration, endeavoured to set it upon its ancient basis; to which end, he gave them a charter, containing not only a confirmation of their old one, but also several new articles of reformation. By this, the company is erected into a body politic, capable of making laws, &c. under the title of the *Company of Merchants of England trading to the seas of the Levant*. The number of members is not limited, but is ordinarily about three hundred. The principal qualification required is, that the candidate be a freeman of London, and a wholesale merchant, either by family or by serving an apprenticeship of seven years. Those under twenty-five years of age pay 25l. sterling at their admission; those above, twice as much. This fine was reduced by act of parliament, in 1753, to 20l. and the privilege of admission extended to every British subject. Each makes oath at his entrance not to send any merchandizes to the Levant but on his own account; and not to consign them to any but the company's agents or factors. This restriction is likewise enlarged by the above mentioned statute.

The company has a court or board at London, which is composed of a governor, deputy-governor, and fifteen directors or assistants; who are all actually to live in London or the suburbs. They have also a deputy-governor in every city and port, where there are any members of the company. The assembly at London sends out the vessels, regulates the tariff for the price at which the European merchandizes sent to the Levant are to be sold, and for the quality of those returned. It raises taxes on merchandizes, to defray impositions, and the common expences of the company; presents the ambassador which the king is to keep at the Porte, elects two consuls for Smyrna and Constantinople, &c.

One of the best regulations of the company is, not to leave the consuls, or even ambassador, to fix the im-

position on vessels for defraying the common expences Company. (a thing fatal to the companies of most other nations); but to allow a pension to the ambassador and consuls, and even to the chief officers, as secretary, chaplain, interpreters, and janizaries, that there may not be any pretence for their raising any sum at all on the merchants or merchandizes.

In extraordinary cases, the consuls, and even the ambassador, have recourse to two deputies of the company, residing in the Levant; or, if the affair be very important, they assemble the whole body. Here are regulated the presents to be given, the voyages to be made, and every thing to be deliberated; and on the resolutions here taken, the deputies appoint the treasurer to furnish the moneys, &c. required.

The ordinary commerce of this company employs from 20 to 25 vessels, carrying from 25 to 30 pieces of cannon. The merchandizes exported thither are, cloths of all kinds and colours, pewter, lead, pepper, cochineal, and a great deal of silver, which they take up at Cadiz: the returns are in raw silk, galls, camlets, wools, cottons, Morocco leather, ashes for making glass and soap, and several gums and medicinal drugs. The commerce to Smyrna, Constantinople, and Scanderoon, is not esteemed much less considerable than that of the East India company; but, is doubtless, more advantageous to Britain; because it takes off much more of the British manufactures than the other, which is chiefly carried on in money. The places reserved for the commerce of this company are, all the states of Venice, in the gulph of Venice; the state of Ragusa; all the states of the grand seignior, and the ports of the Levant and Mediterranean; excepting Carthage, Alicant, Barcelona, Valencia, Marseilles, Toulon, Genoa, Leghorn, Civita Vecchia, Palermo, Messina, Malta, Majorca, Minorca, and Corsica; and other places on the coasts of France, Spain, and Italy.

5. *The Company of Merchants trading to Africa*, established in 1750. Contrary to the former practice with regard to regulated companies, who were reckoned unfit for such sort of service, this company was subjected to the obligation of maintaining forts and garrisons. It was expressly charged at first with the maintenance of all the British forts and garrisons that lie between Cape Blanc and the Cape of Good Hope, and afterwards with that of those only which lie between Cape Rouge and the Cape of Good Hope. The act which establishes this company (the 23d of George II. c. 31.) seems to have had two distinct objects in view; first, to restrain effectually the oppressive and monopolizing spirit which is natural to the directors of a regulated company; and, secondly, to force them as much as possible to give an attention, which is not natural to them, towards the maintenance of forts and garrisons.

For the first of these purposes, the fine for admission is limited to forty shillings. The company is prohibited from trading in their corporate capacity, or upon a joint stock; from borrowing money upon common seal, or from laying any restraints upon the trade which may be carried on freely from all places, and by all persons being British subjects, and paying the fine. The government is in a committee of nine persons who meet at London, but who are chosen annually by the

Company. freemen of the company at London, Bristol, and Liverpool; three from each place. No committee-man can be continued in office for more than three years together. Any committee-man might be removed by the board of trade and plantations; now by a committee of council, after being heard in his own defence. The committee are forbid to export negroes from Africa, or to import any African goods into Great Britain. But as they are charged with the maintenance of forts and garrisons, they may for that purpose export from Great Britain to Africa goods and stores of different kinds. Out of the money which they shall receive from the company, they are allowed a sum not exceeding eight hundred pounds for the salaries of their clerks and agents at London, Bristol, and Liverpool; the house-rent of their office at London; and all other expences of management, commission, and agency, in England. What remains of this sum, after defraying those different expences, they may divide among themselves, as compensation for their trouble, in what manner they think proper. "By this constitution, it might have been expected (Dr Smith observes), that the spirit of monopoly would have been effectually restrained, and the first of these purposes sufficiently answered. It would seem, however, that it had not. Though by the 4th of George III. c. 20. the fort of Senegal, with all its dependencies, had been vested in the company of merchants trading to Africa, yet in the year following (by the 5th of George III. c. 44.), not only Senegal and its dependencies, but the whole coast from the port of Sallee, in South Barbary, to Cape Rouge, was exempted from the jurisdiction of that company, was vested in the crown, and the trade to it declared free to all his majesty's subjects. The company had been suspected of restraining the trade, and of establishing some sort of improper monopoly. It is not, however, very easy to conceive how, under the regulations of the 23d George II. they could do so. From the printed debates of the house of commons (not always the most authentic records of truth), it appears, however, that they have been accused of this. The members of the committee of nine being all merchants, and the governors and factors, in their different forts and settlements, being all dependent upon them, it is not unlikely that the latter might have given peculiar attention to the consignments and commissions of the former, which would establish a real monopoly."

For the second purpose mentioned, the maintenance of the forts and garrisons, an annual sum has been allotted to them by parliament, generally about 13,000l. For the proper application of this sum, the committee is obliged to account annually to the curfitor baron of exchequer; which account is afterwards to be laid before parliament. "But parliament (continues our author), which gives so little attention to the application of millions, is not likely to give much to that of 13,000l. a-year; and the curfitor baron of exchequer, from his profession and education, is not likely to be profoundly skilled in the proper expence of forts and garrisons. The captains of his majesty's navy, indeed, or any other commissioned officers, appointed by the board of admiralty, may enquire into the condition of the forts and garrisons, and report their observations to that board. But that board seems to have no di-

rect jurisdiction over the committee, nor any authority to correct those whose conduct it may thus enquire into; and the captains of his majesty's navy, besides, are not supposed to be always deeply learned in the science of fortification. Removal from an office, which can be enjoyed only for the term of three years, and of which the lawful emoluments, even during that term, are so very small, seems to be the utmost punishment to which any committee-man is liable; for any fault, except direct malversation, or embezzlement either of the public money or of that of the company, and the fear of that punishment, can never be a motive of sufficient weight to force a continual and careful attention to a business to which he has no other interest to attend. The committee are accused of having sent out bricks and stones from England for the reparation of Cape Coast Castle on the coast of Guinea, a business for which parliament had several times granted an extraordinary sum of money. These bricks and stones too, which had thus been sent upon so long a voyage, were said to have been of so bad a quality, that it was necessary to rebuild from the foundation the walls which had been repaired with them. The forts and garrisons which lie north of Cape Rouge, are not only maintained at the expence of the state, but are under the immediate government of the executive power; and why those which lie south of that Cape, and which too are, in part at least, maintained at the expence of the state, should be under a different government, it seems not very easy even to imagine a good reason."

The above company succeeded that called *The Royal African Company*, which traded upon a joint stock with an exclusive privilege. Though England began to trade to Africa as early as the year 1536, and several voyages were made to Guinea in 1588, and some following years, for the importation of gold and elephants teeth, nothing like a company was formed till the year 1588, when queen Elizabeth granted a patent of exclusive privilege to certain persons for ten years. In 1618, king James I. established a company by charter, which was soon dissolved. Another company was erected by charter of Charles I. in 1631, which met with little success; but the demand for negroes in the English American plantations increasing, a third company was established by a charter granted 1662, in favour of the duke of York; securing to him the commerce of all the country, coasts, islands, &c. belonging to the crown of England, or not possessed by any other Christian prince; from Cape Blanco in 20° N. Lat. to the Cape of Good Hope, in 34° 34' S. Lat. The charter was soon after returned into the king's hands by the duke, and revoked, by consent of the parties associated with him in the enterprize; in consequence of which, the fourth and last exclusive company was established and incorporated by letters patent in 1672, under the title of the *Royal African Company*. A capital was soon raised of 111,000l. and this new company improved their trade, and increased their forts; but after the revolution in 1689, this trade was laid open. In 1698, all private traders to Africa were obliged by stat. 9 and 10 Will. to pay ten *per cent.* in order to assist the company in maintaining their forts and factories. But notwithstanding this heavy tax, the company were still unable to maintain the competition; their stock and credit gradually declined.

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Company. In 1712, their debts had become so great, that a particular act of parliament was thought necessary, both for their security and for that of their creditors. It was enacted, that the resolution of two-thirds of these creditors in number and value, should bind the rest, both with regard to the time which should be allowed to the company for the payment of their debts, and with regard to any other agreement which it might be thought proper to make with them concerning those debts. In 1730, their affairs were in so great disorder, that they were altogether incapable of maintaining their forts and garrisons; the sole purpose and pretext of their institution. From that year till their final dissolution, the parliament judged it necessary to allow the annual sum of ten thousand pounds for that purpose. In 1732, after having been for many years losers by the trade of carrying negroes to the West Indies, they at last resolved to give it up altogether; to sell to the private traders to America the negroes which they purchased upon the coast; and to employ their servants in a trade to the inland parts of Africa for gold dust, elephants teeth, dyeing drugs, &c. But their success in this more confined trade was not greater than in their former extensive one. Their affairs continued to go gradually to decline, till at last being in every respect a bankrupt company, they were dissolved by act of parliament, and their forts and garrisons vested in the present *Regulated Company of Merchants trading to Africa*.

II. *JOINT-STOCK Companies*, established either by royal charter or by act of parliament, differ in several respects, not only from regulated companies, but from private copartneries. 1. In a private copartnery, no partner, without the consent of the company, can transfer his share to another person, or introduce a new member into the company. Each member, however, may, upon proper warning, withdraw from the copartnery, and demand payment from them of his share of the common stock. In a joint-stock company, on the contrary, no member can demand payment of his share from the company; but each member can, without their consent, transfer his share to another person, and thereby introduce a new member. The value of a share in a joint-stock is always the price which it will bring in the market; and this may be either greater or less, in any proportion, than the sum which its owner stands credited for in the stock of the company. 2. In a private copartnery, each partner is bound for the debts contracted by the company to the whole extent of his fortune. In a joint-stock company, on the contrary, each partner is bound only to the extent of his share.

The trade of a joint-stock company is always managed by a court of directors. This court indeed is frequently subject, in many respects, to the controul of a general court of proprietors. But the greater part of those proprietors seldom pretend to understand any thing of the business of the company; and when the spirit of faction happens not to prevail among them, give themselves no trouble about it, but receive contentedly such half yearly or yearly dividend as the directors think proper to make to them. This total exemption from trouble and from risk, beyond a limited sum, encourages many people to become adventurers in joint-stock companies, who would upon no

account hazard their fortunes in any private copartnery. Such companies, therefore, commonly draw to themselves much greater stocks than any private copartnery can boast of. The trading stock of the South Sea company, at one time, amounted to upwards of thirty-three millions eight hundred thousand pounds. The directors of such companies, however, being the managers rather of other peoples money than of their own, it cannot well be expected that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master's honour, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company. It is upon this account that joint-stock companies for foreign trade have seldom been able to maintain the competition against private adventurers. They have, accordingly, very seldom succeeded without an exclusive privilege; and frequently have not succeeded with one. Without an exclusive privilege they have commonly mismanaged the trade. With an exclusive privilege they have both mismanaged and confined it.

The principal Joint-stock companies presently subsisting in Great Britain are, the *South Sea* and the *East India* companies; to which may be added, though of very inferior magnitude, the *Hudson's Bay* company.

1. *The South-Sea Company.* During the long war with France in the reign of Queen Anne, the payment of the sailors of the royal navy being neglected, they received tickets instead of money, and were frequently obliged, by their necessities, to sell these tickets to avaricious men at a discount of 40 and sometimes 50 per cent. By this and other means, the debts of the nation unprovided for by parliament, and which amounted to 9,471,321*l.* fell into the hands of these usurers. On which Mr Harley, at that time chancellor of the Exchequer, and afterwards earl of Oxford, proposed a scheme to allow the proprietors of these debts and deficiencies 6 per cent. per annum, and to incorporate them for the purpose of carrying on a trade to the South Sea; and they were accordingly incorporated under the title of "the Governor and Company of Merchants of Great Britain trading to the South Seas, and other parts of America, and for encouraging the Fishery," &c.

Though this company seem formed for the sake of commerce, the ministry never thought seriously, during the course of the war, about making any settlement on the coast of South America, which was what flattered the expectations of the people; nor was it ever carried into execution by this company.

Some other sums were lent to the government in the reign of Queen Anne at 6 per cent. In the third of George I. the interest of the whole was reduced to 5 per cent. and the company advanced two millions more to the government at the same interest. By the statute of the 6th of George I. it was declared, that they might redeem all or any of the redeemable national debts; in consideration of which, the company were empowered to augment their capital according to the sums they should discharge: and for enabling them to raise such sums for purchasing annuities, ex-

Company. changing for ready money new exchequer bills, carrying on their trade, &c. they might, by such means as they should think proper, raise such sums of money as in a general court of the company should be judged necessary. The company were also empowered to raise money on the contracts, bonds, or obligations under their common seal, on the credit of their capital stock. But if the sub-governor, deputy-governor, or other members of the company, should purchase lands or revenues of the crown upon account of the corporation, or lend money by loan or anticipation on any branch of the revenue, other than such part only on which a credit of loan was granted by parliament, such sub-governor, or other member of the company, should forfeit treble the value of the money so lent.

The fatal South Sea scheme, transacted in the year 1720, was executed upon the last mentioned statute. The company had, at first set out with good success, and the value of their stock, for the first five years, had risen faster than that of any other company; and his majesty, after purchasing 10,000*l.* stock, had condescended to be their governor. Things were in this situation, when, taking advantage of the above statute, the South Sea bubble was projected. The pretence was, to raise a fund for carrying on a trade to the South Sea, and purchasing annuities, &c. paid to the other companies: and proposals were printed and distributed, showing the advantages of this design. The sum necessary for carrying it on, together with the profits that were to arise from it, were divided into a certain number of shares, or subscriptions, to be purchased by persons disposed to adventure therein. And the better to carry on the deception, the directors engaged to make very large dividends; and actually declared that every 100*l.* original stock would yield 50*l.* *per annum*: which occasioned so great a rise of their stock, that a share of 100*l.* was sold for upwards of 800*l.* This was in the month of July; but before the end of September it fell to 150*l.* by which multitudes were ruined, and such a scene of distress occasioned, as is scarcely to be conceived. But the consequences of this infamous scheme are too well known; most of the directors were severely fined, to the loss of nearly all their property; some of them had no hand in the deception, nor gained a farthing by it; but it was agreed, they ought to have opposed and prevented it.

The South Sea company never had any forts or garrisons to maintain, and therefore were entirely exempted from one great expence, to which other joint-stock companies for foreign trade are subject. But they had an immense capital divided among an immense number of proprietors. It was naturally to be expected, therefore, that folly, negligence, and profusion, should prevail in the whole management of their affairs.

Their stock-jobbing speculations were succeeded by mercantile projects, which, Dr Smith observes, were not much better conducted. The first trade which they engaged in, was that of supplying the Spanish West Indies with negroes, of which (in consequence of what was called the *Asiento* contract granted them by the treaty of Utrecht) they had the exclusive privilege. But as it was not expected that much profit could be made by this trade, both the Portuguese and

French companies, who had enjoyed it upon the same terms before them, having been ruined by it, they were allowed, as compensation, to send annually a ship of a certain burden to trade directly to the Spanish West Indies. Of the ten voyages which this annual ship was allowed to make, they are said to have gained considerably by one, that of the *Royal Caroline* in 1731, and to have been losers, more or less, by almost all the rest. Their ill success was imputed, by their factors and agents, to the extortion and oppression of the Spanish government; but was, perhaps, principally owing to the profusion and depredations of those very factors and agents; some of whom are said to have acquired great fortunes even in one year. In 1734, the company petitioned the king, that they might be allowed to dispose of the trade and tonnage of their annual ship, on account of the little profit which they made by it, and to accept of such equivalent as they could obtain from the king of Spain.

In 1724, this company had undertaken the whale-fishery. Of this, indeed, they had no monopoly; but as long as they carried it on, no other British subjects appear to have engaged in it. Of the eight voyages which their ships made to Greenland, they were gainers by one, and losers by all the rest. After their eighth and last voyage, when they had sold their ships, stores, and utensils, they found that their whole loss, upon this branch, capital and interest included, amounted to upwards of *L.* 237,000.

In 1722, this company petitioned the parliament to be allowed to divide their immense capital of more than *L.* 33,800,000, the whole of which had been lent to government, into two equal parts: The one half, or upwards of *L.* 16,900,000, to be put upon the same footing with other government annuities, and not to be subject to the debts contracted, or losses incurred, by the directors of the company, in the prosecution of their mercantile projects; the other half to remain, as before, a trading stock, and to be subject to those debts and losses. The petition was too reasonable not to be granted. In 1733, they again petitioned the parliament, that three-fourths of their trading stock might be turned into annuity stock, and only one-fourth remain as trading stock, or exposed to the hazards arising from the bad management of their directors. Both their annuity and trading stocks had, by this time, been reduced more than *L.* 2,000,000 each, by several different payments from government; so that this fourth amounted only to *L.* 3,662,784, 8s. 6d. In 1748, all the demands of the company upon the king of Spain, in consequence of the *Asiento* contract, were, by the treaty of Aix-la-Chapelle, given up for what was supposed an equivalent. An end was put to their trade with the Spanish West Indies, the remainder of their trading stock was turned into an annuity stock, and the company ceased in every respect to be a trading company.

This company is under the direction of a governor, sub-governor, deputy-governor, and 21 directors; but no person is qualified to be governor, his majesty excepted, unless such governor has, in his own name and right, *L.* 5000 in the trading stock; the sub-governor is to have *L.* 4000, the deputy-governor *L.* 3000, and a director *L.* 2000, in the same stock. In every general court, every member having in his own name and right *L.* 500 in trading

Company.

Company. trading stock, has one vote; if L. 2000 two votes; if L. 3000 three votes; and if L. 5000 four votes.

2. *The East India Company.* The first, or as it is called the *Old East India Company*, was established by a charter from Queen Elizabeth in 1600; but for some time the partners seem to have traded with separate stocks, though only in the ships belonging to the whole company. In 1612, they joined their stocks into one common capital; and though their charter was not as yet confirmed by act of parliament, it was looked upon in that early period to be sufficiently valid, and no body ventured to interfere with their trade. At this time their capital amounted to about L. 740,000, and the shares were as low as L. 50; their trade was in general successful, notwithstanding some heavy losses, chiefly sustained through the malice of the Dutch East India company. In process of time, however, it came to be understood that a royal charter could not by itself convey an exclusive privilege to traders, and the company was reduced to distress by reason of the multitude of interlopers who carried off the most of their trade. This continued during the latter part of the reign of Charles II. the whole of that of James II. and part of William III. when in 1698 a proposal was made to parliament for advancing the sum of L. 2,000,000 to government, on condition of erecting the subscribers into a new company with exclusive privileges. The old company endeavoured to prevent the appearance of such a formidable rival, by offering government L. 700,000, nearly the amount of their capital at that time; but such were the exigencies of the state at that time, that the larger sum, tho' at eight *per cent.* interest, was preferred to the smaller at one half the expence.

Thus were two East India Companies erected in the same kingdom, which could not but be very prejudicial to each other. Through the negligence of those who prepared the act of parliament also, the new company were not obliged to unite in a joint-stock. The consequence of this was, that a few private traders, whose subscriptions scarce exceeded L. 7200, insisted on a right of trading separately at their own risk. Thus a kind of third company was established; and by their mutual contentions with one another, all the three were brought to the brink of ruin. Upon a subsequent occasion, in 1730, a proposal was made to parliament for putting the trade under the management of a regulated company, and thus laying it in some measure open. This, however, was opposed by the company, who represented in strong terms the mischiefs likely to arise from such a proceeding. "In India (they said), it raised the price of goods so high, that they were not worth the buying; and in England, by overstocking the market, it sunk the price to such a degree, that no profit could be made of them." Here Dr Smith remarks, that by a more plentiful supply, to the great advantage and conveniency of the public, it must have reduced very much the price of India goods in the English market, cannot well be doubted; but that it should have raised very much their price in the Indian market, seems not very probable, as all the extraordinary demand which that competition could occasion, must have been but as a drop of water in the immense ocean of Indian commerce. The increase of demand, adds he, though in the beginning it may sometimes

raise the price of goods, never fails to lower it in the long run. It encourages production, and thereby increases the competition of the producers, who, in order to undersell one another, have recourse to new divisions of labour and new improvements of art, which might never otherwise have been thought of. The miserable effects of which the company complained, were the cheapness of consumption and the encouragement given to production, precisely the two effects which it is the business of political economy to promote. The competition, however, of which they gave this doleful account, had not been allowed to continue long. In 1702 the two companies were, in some measure, united by an indenture tripartite, to which the queen was the third party; and, in 1708, they were, by act of parliament, perfectly consolidated into one company by their present name of *The United Company of Merchants trading to the East Indies*. Into this act it was thought worthy to insert a clause, allowing the separate traders to continue their traffic till Michaelmas 1711, but at the same time empowering the directors, upon three years notice, to redeem their capital of L. 7200, and thereby convert the whole capital of the company into a joint-stock. By the same act, the capital of the company, in consequence of a new loan to government, was augmented from L. 2,000,000 to L. 3,200,000. In 1743, another million was advanced to government. But this being raised, not by a call upon the proprietors, but by selling annuities and contracting bond-debts, it did not augment the stock upon which the proprietors could claim a dividend. Thus, however, their trading stock was augmented; it being equally liable with the other L. 3,200,000, to the losses sustained, and debts contracted, by the company in the prosecution of their mercantile projects. From 1708, or at least from 1711, this company being freed from all competitors, and fully established in the monopoly of the English commerce to the East Indies, carried on a successful trade; and from their profits made annually a moderate dividend to their proprietors. Unhappily, however, in a short time, an inclination for war and conquest began to take place among their servants; which, though it put them in possession of extensive territories and vast nominal revenues, yet embarrassed their affairs in such a manner, that they have not to this day been able to recover themselves. The particulars of these wars are given under the articles *BRITAIN*, and *INDOSTAN*. Here it will be sufficient to observe, that they originated during the war in 1741 through the ambition of M. Dupleix the French governor of Pondicherry, who involved the company in the politics and disputes of the Indian princes. After carrying on hostilities for some time with various success, they at last lost Madras, at that time the principal settlement in the East Indies, but it was restored by the treaty of Aix-la-Chapelle. During the war of 1755, they acquired the revenues of a rich and extensive territory, amounting, as was then said, to near L. 3,000,000, *per annum*.

For several years they remained in quiet possession of the revenue arising from this territory, though it certainly never answered the expectations that had been formed concerning it. But in 1767 the British ministry laid claim to the territorial possessions of the company,

Company, company, and the revenue arising from them, as of right belonging to the crown; and the company, rather than yield up their territories in this manner, agreed to pay government a yearly sum of L. 400,000. They had before this gradually augmented their dividend from about six to ten *per cent.*; that is, on their capital of L. 3,200,000, they had raised it from L. 192,000 to L. 320,000 a-year. About this time also they were attempting to raise it still further, viz. from 10 to 12½ *per cent.*; but from this they were prevented by two successive acts of parliament, the design of which was to enable them to make a more speedy payment of their debts, at this time estimated at more than six or seven millions Sterling. In 1769 they renewed their agreement with government for five years more, stipulating, that during the course of that period they should be allowed gradually to augment their dividend to 12½ *per cent.*; never increasing it, however, more than one *per cent.* annually. Thus their annual payments could only be augmented by L. 608,000 beyond what they had been before their late territorial acquisitions. By accounts from India in the year 1768, this revenue, clear of all deductions and military charges, was stated at L. 2,048,747. At the same time they were said to possess another revenue, arising partly from lands, but chiefly from the customs established at their different settlements, amounting to about L. 439,000. The profits of their trade, too, according to the evidence of their chairman before the house of commons, amounted to at least L. 400,000 *per annum*; their accountant made it L. 500,000; and the lowest account stated it at least equal to the highest dividend paid to their proprietors. Notwithstanding this apparent wealth, however, the affairs of the company from this time fell into disorder; inasmuch that in 1773 their debts were augmented by an arrear to the treasury in the payment of the L. 400,000 stipulated; by another to the customhouse for duties unpaid; by a large sum borrowed from the bank; and by bills drawn upon them from India to the amount of more than L. 1,200,000. Thus they were not only obliged to reduce their dividend all at once to six *per cent.* but to apply to government for assistance. A particular account of this transaction is given under the article BRITAIN. Here it may be mentioned in general, that the event proved very unfavourable to the company, as they were now subjected to an interference of government altogether unknown before. Several important alterations were made in their constitution both at home and abroad. The settlements of Madras, Bombay, and Calcutta, which had hitherto been entirely independent of one another, were subjected to a governor-general, assisted by a council of four assessors. The nomination of the first governor and council, who were to reside at Calcutta, was assumed by parliament; the power of the court of Calcutta, which had gradually extended its jurisdiction over the rest, was now reduced and confined to the trial of mercantile causes, the purpose for which it was originally instituted. Instead of it a new supreme court of judicature was established, consisting of a chief justice and three judges to be appointed by the crown. Besides these alterations, the stock necessary to intitle any proprietor to vote at the general courts was raised from L. 500 to L. 1000. To vote on this qualification, too, it was

necessary that he should have possessed it, if acquired by his own purchase and not by inheritance, for at least one year, instead of six months, the term requisite formerly. The court of 24 directors had before been chosen annually; but it was now enacted, that each director should for the future be chosen for four years; six of them, however, to go out of office by rotation every year, and not to be capable of being re-chosen at the election of the six new directors for the ensuing year. It was expected that, in consequence of these alterations, the courts both of the proprietors and directors would be likely to act with more dignity and steadiness than formerly. But this was far from being the case. The company and its servants showed the utmost indifference about the happiness or misery of the people who had the misfortune to be subjected to their jurisdiction. This indifference, too, was more likely to be increased than diminished by some of the new regulations. The house of commons, for instance, had resolved, that when the L. 1,600,000 lent to the company by government should be paid, and their bond debts reduced to L. 1,500,000, they might then, and not till then, divide eight *per cent.* upon their capital; and that whatever remained of their revenues and nett profits at home should be divided into four parts; three of them to be paid into the exchequer for the use of the public, and the fourth to be reserved as a fund, either for the further reduction of their bond-debts, or for the discharge of other contingent exigencies which the company might labour under. But it could scarce be expected that, if the company were bad stewards and bad sovereigns when the whole of their nett revenue and profits belonged to themselves, they would be better when three-fourths of these belonged to other people. The regulations of 1773, therefore, did not put an end to the troubles of the company. Among other institutions, it had been at this time enacted, that the presidency of Bengal should have a superiority over the other presidencies in the country; the salary of the chief justice was fixed at L. 8000 *per annum*, and those of the other judges at L. 6000 each. In consequence of this act, Sir Elijah Impey, who was created a baronet on the occasion, set sail, with three other judges, for India in the year 1774. The powers with which they were invested were very extraordinary. They had the title of His Majesty's Supreme Court of Judicature in India. Civil law, common law, ecclesiastical, criminal, and admiralty jurisdiction, belonged of right to them. They were empowered to try Europeans on personal actions, and to assess damages, without a jury. Every native, either directly or indirectly in the service of the company, or in their territories, was made subject to their jurisdiction, with a view to prevent the Europeans from eluding justice under the pretence of employing natives in the commission of their crimes; so that in fact they were absolute lords and sovereigns of the whole country.

Such excessive and unlimited powers conferred on any small number of men, could not but be extremely disagreeable to the Europeans, who had been accustomed to enjoy a liberty almost equally unbounded before; nor was it to be supposed that the judges, thus suddenly raised from the rank of subjects to the height of despotism, would always use their power in an unexceptionable

Company. tionable manner. The design of the establishment was to preserve the commerce and revenues of the company from depredation, by subjecting its servants to the controul of the court; to relieve the subject from oppression by facilitating the means of redress; and to fix a regular course of justice for the security of liberty and property. Instead of considering the circumstances of the country, however, or the manners and customs of the natives, the judges now precipitately introduced the British laws in their full extent, without the least modification to render them agreeable to the Asiatics, who had been accustomed to others of a quite different nature; nor did they even pay the least regard to the religious institutions or habits to which the Indians are so obstinately attached, that they would sooner part with life itself than break through an article of them.

Besides this it was said, that, on the first arrival of the judges, they endeavoured to extend their authority beyond even what the British legislature had allowed them. Hence they were frequently at variance with the council; and complaints of their conduct were repeatedly sent to England by the servants of the company. These produced a letter in 1777 from the directors to Lord Weymouth, secretary of state for the southern department. In this they stated, that the supreme court of India had extended its jurisdiction to those whom it did not appear to have been the intention of the king or parliament to subject to its authority. It had also taken cognizance of matters which, they apprehended, belonged properly to other courts. That the judges considered the criminal law of England as in force, and binding on the natives of Bengal, though utterly repugnant to the laws and customs by which they had hitherto been governed; and that the jurisdiction exercised by the supreme court was incompatible with the powers given by parliament to the governor-general and council, obstructed the administration of government, and tended to alienate the minds of the natives; all which they feared would prevent the establishment of the government of India upon any settled or permanent foundation.

This letter not having produced any effect, the discontent of India, both in the Europeans and natives, continued and increased. The decisions of the judges were such as by no means did them honour. A number of adventurers had also emigrated along with them, in hopes of enriching themselves under the new constitution. Some of these were of the lowest sort of people, who had rendered it in a manner impossible for them to remain in England on account of their vices or extravagance. Many such persons had enrolled themselves among the domestics of the judges, or had become their immediate dependents; and some of these were permitted to assume the characters of attorneys, court-officers, under-sheriffs, and bailiffs. It may easily be supposed, that people of such characters would find it for their interest to promote suits in the supreme court: and in this some of them employed themselves with great success. The consequence of all this was, that on the 4th of December 1780, a petition was presented against the supreme court by a great number of British inhabitants in the kingdoms of Bengal, Bahar, and Orixá. In this, complaint was made of the indiscriminate man-

ner in which the judges of the supreme court attempted to exercise the English laws in that country, at the same time that they refused the undoubted right of every British subject, viz. that of trial by jury. They intreated the house "to reflect on the innumerable hardships which must ensue, and the universal confusion which must be occasioned, by giving to the voluminous laws of England a boundless retrospective power in the midst of Asia, and by an application of those laws made for the freest and most enlightened people on earth, the principle of whose constitution was founded on virtue and liberty, to transactions with the natives of India, who had, from time immemorial, lived under a despotic government founded on fear and restraint. What must be the terrors of individuals to find their titles to property, and their transactions with the natives previous to the establishment of this court of judicature, tried by the standard of the English law, and by men educated under its forms, and unavoidably imbibing its prejudices, when no such laws could be known to or practised by natives or Europeans then residing in the country, and that at a time when there were few persons of legal knowledge in the country to advise or assist them? No tyranny could be more fatal in its consequences, than that a court, invested with all the authority of one of the first courts in England, should also possess undefined powers and jurisdiction, of which its judges were the sole interpreters, and at such an immense distance from the mother country. This was in truth the situation of the British subjects in India at that time; for the judges of the supreme court could at pleasure determine on the denomination of a civil jury, the degree of guilt incurred by any offence, the statute by which it should be tried, what penalties should be inflicted, as well as who were and who were not amenable to the jurisdiction of the court.

"Besides their other powers also, the judges of the supreme court were allowed to sit as a court of chancery, and in that capacity to revise, correct, rescind, or confirm the decisions passed by themselves as a court of law; and, by another part of their constitution, they were allowed to stop execution in criminal cases until his Majesty's pleasure was known. The petitioners conceived, that there must be some fundamental error in that institution, which required a more than ordinary degree of temper, integrity, and ability, to carry its purposes into execution; and they did not hesitate to declare, that to administer the powers appertaining to the institution of the supreme court, without committing flagrant acts of injustice, and doing great detriment to the public, required more equity, moderation, discernment, and enlightened abilities, than they could hope to find in any set of men." They concluded with earnestly soliciting parliament, that a trial by jury might be granted to the British subjects in Bengal, in all cases where it was established by law in England; that the retrospective powers of the supreme court might be limited to the time of its establishment in Bengal; that it should be defined beyond the power of discretionary distinction, who the persons were that properly came under the jurisdiction of the court, and who did not; that it should be expressly declared what statutes should, and what should not, be in force in Bengal; that distinct and separate judges for

Company. for the law and equity sides of the court should be appointed; and that a power of delaying executions in criminal cases until his Majesty's pleasure was known, should be lodged in the governor and council.

This petition was soon followed by another signed by Warren Hastings, Esq; governor-general Philip Francis and Edward Wheeler, Esqs; counsellors for the government and presidency of Fort-William in Bengal; in which they represented, "that, though the jurisdiction of the supreme court of judicature at Calcutta, as well as the powers granted to the governor-general and council, were clearly limited by parliament and the king's letters patent, yet the chief justice and judges of that court had exercised authority over persons not legally within their jurisdiction, and had illegally and improperly advised and admitted suits against the governor-general and council: that they had attempted to execute their writs upon natives of high rank in the kingdom of Bengal, who were not within their jurisdiction: the governor and council therefore had found themselves under a necessity of opposing them, and of affording protection to the country and people, who were placed under their own immediate inspection, and freeing them from the terrors of a new and usurped dominion. They had even been obliged to make use of a military force, in order to resist the proceedings of the judges and their officers: And they declared, that no other conduct could have saved those provinces and the interests of the company, or of the British nation itself, from the ruin with which they were threatened. They also declared themselves to be of opinion, that the attempt to extend, to the inhabitants of these provinces, the jurisdiction of the supreme court of judicature, and the authority of the English law, which were still more intolerable than the law itself, would be such a constraint on the minds of the people of those provinces, by the difference of such laws and forms from their laws, that they might at last inflame them, notwithstanding their known mildness and patience, into an open rebellion." The petition was concluded, by soliciting an indemnity from the legal consequences of the resistance they had been obliged to make to that court.

While the British were thus expressing their displeasure against the conduct of these judges, the natives were thrown into the utmost consternation and despair by the acts of oppression and violence committed by them. A prosecution for forgery had been commenced against Nuncomar, a bramin of the first rank in Bengal. The crime was not capital by the laws of Indostan, and had been committed many years before; yet with the utmost cruelty and injustice was this man condemned and executed on the British statute, by which forgery is made capital: a statute which, at the commission of the crime, he had never heard of, nor could ever dream that he would be subjected to its power. What rendered this execution the more remarkable was, that, at the very time when charge of forgery was brought against him, Nundcomar had been employed in exhibiting an accusation against Mr Hastings. This, together with the hurry in which the court were to have him put to death (for the court refused to allow him a respite till his Majesty's pleasure was known), made the natives conclude, that he was executed, not on account of the

Company. forgery, but for having ventured to prefer an accusation against an English governor. In other respects they were terrified to such a degree, that many of them ran into the river on seeing a bramin put to death with such circumstances of ignominy.

The alarm excited by the execution of Nundcomar was kept up by fresh decisions of the supreme court. Among those the Patna cause, as it is commonly called, was one of the most remarkable. An adventurer, named Shahaz Beg Cawn, had come from Cabul in Persia to Bengal, where he entered himself in the service of the company, and was preferred to the command of a body of horse. Having gained a competent fortune, and obtained from the Mogul a grant of lands called an *Ultumghaw* in the province of Bahar, he retired from the army, and settled in Patna. About this time, when advanced in years, he married a woman of low rank, named *Nadara Begum*, by whom he had no children. His brother, Allum Beg, came likewise to Patna; and on his leaving the place some time after, committed the care of one of his sons, named *Behader Beg*, to his brother Shahaz Beg Cawn. On the death of the latter in 1776, a dispute ensued concerning the inheritance betwixt the widow and Behader Beg. The widow having taken possession of the whole property of Shahaz, the nephew, as adopted son and heir, gave in a petition to the provincial council at Patna, on the 2d of January 1777, setting forth his claim. In this petition he stated, that the widow was removing and secreting the effects of the deceased; and concluded with a prayer, that orders should be given to prevent their removal; to recover such as had already been carried away; and that the *cadi* or Indian judge should be directed to ascertain his right. As the parties were Mahometans, the council of course referred the cause to the *cadi* and two *musties*, the proper officers for determining it according to the established laws of the country. These having inquired into the matter, reported, that the title deeds, on which the widow pretended to found her right, appeared to be forged; and that, even if they had appeared in the life-time of Shahaz, they were still informal, on account of a point of the Mahometan law, which requires, that to make deeds of gift valid, possession should be entered into at the time of executing or delivering them over; but that, as no possession of this kind had been given, the estate ought to be divided according to the Mahometan law; viz. one-fourth to the wife, and three-fourths to the nephew, as the representative of his father Allum Beg, who was considered as the more immediate heir of the deceased. This decision was confirmed by the council of Patna, with the following exception in favour of the widow, that the heir at law should pay her one-fourth of the rents of the *ultumghaw*, or royal grant, for her support during life. The widow, however, refused to submit to the decision, or to deliver up the effects of her husband: in consequence of which compulsory methods were used; when, by the advice of some English lawyers, an action of trespass was brought, according to the law of England, against the *cadi* and two *musties* for their proceedings against her, laying the damages at about 66,000l. Sterling. This process being brought before the supreme court, was by them conducted in such a manner as must entail everlasting

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Company. infamy on the actors. They began with obliging the cadi and musties to find bail in no less than 40,000 pounds for their appearance, which was immediately given by the council at Patna. The supreme court then having entered into the merits of the cause, and decided the matter in the most rigorous manner, according to all the forms of English law, assessed the cadi and musties in damages no less than 30,000 l. Sterling. Their houses and effects were seized by the sheriff's officers, and publicly put up to sale; the cadi, who was upwards of 60 years of age, and had been in office for many years with great applause, died on his way to the common gaol at Calcutta, to which the nephew and two musties were conveyed, being a distance of no less than 400 miles from their former residence at Patna. A suit, however, was commenced against the widow, on account of having forged the title-deeds by which she claimed her husband's estate; but it was suppressed on account of some informality.

Another decision, by which the supreme court likewise incurred much censure, was that against Jaggernaut, the principal public officer of a Mahometan court at Dacca. The action was brought at the instigation of an English attorney, in behalf of one Khyne, a servant or messenger, who had been fined and imprisoned for a misdemeanor, in which Jaggernaut had concurred in virtue of his office as judge of the Nizamut (the name of the Mahometan court just mentioned). The sheriff-officers attempted to arrest the judge as he sat on the tribunal; which could not fail to produce much disturbance. Jaggernaut, with his officers, denied the authority of the supreme court over the Nizamut, and refused to comply with the writ. The English sheriff-officers proceeded to force; and a violent scuffle ensuing, Jaggernaut's father was wounded in the head with a sword by one of the under-sheriff's attendants, while his brother-in-law was very dangerously wounded with a pistol bullet by the under-sheriff himself. The immediate consequence of this was an absolute refusal of the judge to take cognizance of any criminal matters; and this was intimated in a letter from the council at Dacca to the English governor and council of India; wherein they declared that all criminal justice was at a stand.

The supreme court, having proceeded in this arbitrary and oppressive manner for some time, at length attempted to extend their jurisdiction over the hereditary Zemindars of Bengal. These are a kind of tributary lords, or great landholders, who are answerable to the company for the revenues or rents of the districts; and excepting the circumstance of remitting their revenues to the company, have not the least connection with the English in any respect. At the time we speak of, however, a writ, upon an action of debt, was issued out to arrest one of these Zemindars in his palace. Timely notice, however, was given, by one of the company's collectors, of this attempt to the governor and council, and application made to protect a man of such quality from the disgrace of an arrest. They being unanimously of opinion that the Zemindar was not within the jurisdiction of the court of Calcutta, desired him to pay no regard to the writ. The court, however, determined to enforce their process by a writ of sequestration; upon which the na-

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tives, who are superstitiously attached to their Zemindars, rose in his defence, and insulted the sheriff's officers. The latter having obtained a reinforcement, the Zemindar's palace was entered by 86 men armed with bludgeons, cutlasses, and muskets; the apartment of his women, always held inviolably sacred by the Asiatics, was broken open; his temple profaned; and the image, which was the object of his worship, put into a basket, and carried off with some common lumber. This roused the attention of the governor and council; who, from a full conviction of the ruinous tendency of these proceedings, determined at last to oppose it force by force. They accordingly sent a party of military to apprehend the sheriff's people, and they were all conducted prisoners to Calcutta. The judges ordered attachments against the officer who commanded the troops, and against two other servants of the company; while the governor and council endeavoured to justify their proceedings, by writing to England as already mentioned.

Besides all this, the natives themselves testified their disapprobation of the conduct of the supreme court in very strong terms. A petition to his Britannic majesty was sent by the natives of Patna; in which are the following remarkable passages! "When the ordinances of this court of judicature were issued, as they were all contrary to the customs, modes, usages, and institutions, of this country, they occasioned terror in us; and day by day, as the powers of this court have become more established, our ruin, uneasiness, dishonour, and discredit, have accumulated; till at last we are reduced to such a situation, that we consider death to us as infinitely preferable to the dread we entertain of the court: for from this court no credit or character is left to us, and we are now driven to the last extremity. Several who possessed means and ability, deeming flight as their only security, have banished themselves from the country; but bound as we are by poverty and inability, and fettered by the dearest ties of consanguinity, we do not all of us possess the means of flight, nor have we power to abide the oppression of this court."—"If, which God forbid! it should so happen, that this our petition should not be accepted, and should be rejected at the chamber of audience, those amongst us who have power and ability, discarding all affection for our families, will fly to any quarter we can; whilst the remainder, who have no means or ability, giving themselves up with pious resignation to their fate, will sit down in expectation of death."

These repeated complaints could not but be taken notice of in parliament. On the 12th of February 1781, General Smith made a motion in the house of commons, that the petition from the British inhabitants of Bengal, Bahar, and Orissa, should be taken into consideration by a select committee, consisting of 15 persons, chosen by ballot. In the introduction to his motion, he stated briefly the bad conduct of the supreme court in the particulars already related; and concluded, that the affairs of Bengal required the immediate attention and consideration of parliament. The matter was accordingly debated; when, after various proposals, a motion was at length made by General Smith, for leave to bring in a bill "to explain and amend so much of an act passed in the 13th year of his present majesty, for the better regulation of the East

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Company. India company, as related to the administration of justice in Bengal; and also to indemnify the governor and council of Bengal for having resisted by force of arms the execution of an order of the supreme court of judicature in that kingdom." Leave was accordingly given to bring in the bill. The house having resolved itself into a committee, Lord North observed, "that it had been much his wish that an agreement for the renewal of the company's charter had been made in an amicable manner; and that voluntary propositions should have come from themselves, offering terms for the benefit of the exclusive trade and the territorial acquisitions. No such terms, however, had been proposed, nor any agreement made. A negotiation had indeed taken place between him and the chairman and deputy-chairman; but the propositions made by them were neither such as the public might expect, nor had the company any right to them. With regard to the territorial possessions, he was clearly of opinion, that they of right belonged to the public; though how far it might be proper to allow the revenue of them to remain in the possession of the company was quite another matter. In his opinion, it would be proper to allow it to remain in their hands as long as they possessed an exclusive trade, but he never would consent to forego the claim of the public. He made a motion, therefore, that it was the opinion of the committee, that three-fourths of the surplus of the net profits of the East India company, ever since the company's bond-debt was reduced to L. 1,500,000, and the company's dividends had been eight *per cent. per annum*, belong to the public; and that L. 600,000 in lieu thereof, and in discharge of all claims on the part of the public, be paid into his majesty's exchequer by instalments, in such manner and at such times, as shall be agreed on." This proposal was vehemently opposed by the minority. Mr Burke called it the daring effort of a minister determined on rapine and plunder, without regard to truth, honour, or justice. Mr Hufsey reprobated the idea of taking L. 600,000 from the company in their circumstances at that time. He produced a paper full of arithmetical calculations, which he read to the house; asserting that they contained an exact state of the amount of the company's exports and imports, the expences of their trade at home, and the balance of profit of each year, for many years past, distinguishing the territorial from the commercial income and expences. From these he showed, that the commercial and territorial revenues of the company had, upon an average for 16 years, constituted a sum equivalent to a proportion of 16 *per cent.*; that 9 *per cent.* of this had arisen from the commercial profits accruing to the company; and therefore, that there had not been 8 *per cent.* divided upon that part of the profits to which the public had any claim or pretension. The accession of territorial possessions, he observed, had brought along with it additional expences; and the public had already received a very large share of the company's profits. He declared it to be his opinion, that the company should always make it a rule to give as ample and full relief to the public burdens as their situation would allow; and if they did this, he saw no reason why the minister should expect any more. Mr Dempster reminded the house of the consequences of violating the American charters; and added, that to

tear from the company by force what was not stipulated in any act of parliament, would be a breach of public faith disgraceful to the nation, and such as would damp the spirit of enterprize and adventure which had been productive of such happy effects.—Notwithstanding these remonstrances, however, the bill was at last passed into a law; only with this mitigation, that the company should pay only L. 400,000, instead of L. 600,000 demanded originally by the minister.—Another bill was also passed the same year, in consequence of the motion made by General Smith. This act declared, that the governor-general and council of Bengal were not subject to the jurisdiction of the supreme court, and indemnified the former for the resistance they had made to the orders of that court. It enacted also, that no person should be subject to the jurisdiction of that court on account of his being a landholder or farmer of land in the provinces of Bengal, Bahar, or Orissa; that no judicial officers in the country courts should be liable to actions in the supreme court for their decisions; and the two musties, with Behader Beg, who were then in prison, in consequence of the decision of that court in the Patna cause, were ordered to be set at liberty.

The debates on this subject were attended with the most violent charges against the minister, and assertions the most humiliating and disgraceful to the British nation. Mr Townshend affirmed, that it was from the minister's screening the delinquents who came from India that all the evils in that quarter had originated; and if matters were suffered to go on in that country as they had done for some time past, the conduct of the British in the East Indies must be viewed in a light still more detestable than that of the Spaniards in America. It was reported, that the nabob of Arcot had several members in the house of commons! If it were true, that by sending over a sum of money to England he could seat eight or ten members in that house, then Mr Townshend declared, that in his opinion they were the most abject and contemptible beings in the world.—The bill for regulating the powers of the supreme court, also, though so evidently founded in reason and justice, did not pass without opposition, particularly from Mr Dunning; who was thought on this occasion to have allowed his regard for his friend Sir Elijah Impey, the chief justice, to bias him too much.

The regulations just mentioned did not yet put an end to the troubles of the East India company, nor allay the ferment which had been so effectually excited. Their affairs were still a subject of parliamentary discussion; and in the month of April 1782, a motion was made by Mr Dundas, then Lord Advocate of Scotland, for taking into consideration the several reports concerning affairs, which had been made by the secret committee appointed to inquire into them during the last and present session of parliament. In his speech on this occasion, he remarked, that the opinion of Lord Clive had been against keeping too extensive a territory in that country. Instead of this, he had restored Sujah Dowlah to the possession of his country; considering the British territories in Hindostan, with those on the coasts of Coromandel and Bombay, as sufficient for all the purposes by which this country could be benefited; but instead of adhering to the maxims of sound policy laid

Company. laid down by his Lordship, they had become so ambitious of extending their territories, that they had involved themselves in a war with almost all India. He then considered the finances of the company. The revenue of Bombay, he said, fell short of the necessary civil and military establishment by L. 200,000 a-year, which was annually drawn from Bengal. With regard to that of Madras, it appeared, on an average of 12 years, from 1767 to 1779, that there had been eight years of war and only four of peace; and that, during the whole time of war, the revenue had not been able to support the civil and military establishments; though, in time of peace, it was able to do nearly one-half more. Bengal, however, was the most lucrative of all the East India settlements; but such had been the expences of the Mahratta war, that the governor-general had been obliged to contract a very large debt, inasmuch that it was doubtful whether the investments for England should be wholly or partially suspended. Mr Hastings, he said, had in many instances proved himself a very meritorious servant: but he wished that every one of their servants would consider himself as bound in the first place to prove a faithful steward to the company; not to fancy that he was an Alexander or Aurengzebe, and prefer frantic military exploits to the improvement of the trade and commerce of his country.—General Smith observed, that by the evidence produced to the committee, it appeared that there had been a variety of great abuses in India. Sir Elijah Impey, his majesty's chief justice in that country, had so far derogated from the character of a judge, as to accept of a place from the company; by which means he was brought under their controul, and consequently allowed himself to be deprived of that independency which he ought to possess as a judge. Justice had been so partially administered, that several worthy and respectable persons had been imprisoned, some had been ruined, and others died in jail. From all which considerations he moved, that the affairs of the company ought to be taken into consideration by a committee of the whole house. Some hints were thrown out by Mr Dundas, that the territorial possessions in the East ought to be taken from the company entirely, and put under the direction of the crown; but this was opposed by Mr Fox, as furnishing ministers with such ample means of corruption and undue influence, as might overthrow the constitution entirely. For this reason, he thought it would be more prudent to leave the appointment of its own servants to the company; but at the same time to keep a watchful eye over them, in order to be able to punish and remove those who should be found delinquent.

The house having resolved itself into a committee, a motion was made by General Smith, "That Warren Hastings, Esq; governor-general of Bengal, and Sir Elijah Impey, the chief justice, appear to have been concerned, the one in giving, the other in receiving, an office not agreeable to the late act for regulating the company's affairs; which unjustifiable transaction was attended with circumstances of evil tendency and example." Resolutions were also passed for ascertaining more distinctly the powers of the governor-general and council of Bengal; and votes of censure against Laurence Sullivan, Esq; chairman of the East India-

Company. company, for having neglected to transmit to India an act for explaining and amending the act for regulating the affairs of the company, and for the relief of certain persons imprisoned at Calcutta. Among the number of this gentleman's transgressions, also, was his imposing an oath of secrecy on Mr Wilkes, one of the company's clerks; and especially his restraining him from giving information to a select committee of the house of commons.

Mr Dundas having made several motions tending to criminate Sir Thomas Rumbold, formerly governor of Bengal, a bill was brought in, and passed into a law, for restraining him and Peter Per-ring, Esq; from going out of the kingdom for the space of one year, for discovering their estates, &c. An address was also presented to the king, requesting him to recal Sir Elijah Impey from India, in order to answer for high crimes and misdemeanors. A number of other resolutions were now passed by the house, in consequence of motions by Mr Dundas, and which were founded on the reports of the Secret Committee. Among these it was resolved, "That the orders of the Court of Directors of the East India Company, which have conveyed to their servants abroad a prohibitory condemnation of all schemes of conquest and enlargement of dominion, by prescribing certain rules and boundaries for the operation of their military force, were founded no less in wisdom and policy than in justice and moderation. That every transgression of these orders, without evident necessity, by any of the several governments in India, has been highly reprehensible, and tended in a great degree to weaken the force and influence, and to diminish the influence of the company in those parts. That every interference of the company as a party in the domestic or national quarrels of the country powers, and all new engagements with them in offensive alliance, have been wisely and providentially forbidden by the company in their commands to their administrations in India. That every unnecessary deviation from these rules should be severely reprov'd and punished. That the maintenance of an inviolable character for moderation, good faith, and scrupulous regard to treaty, ought to have been the simple grounds on which the British government should have endeavoured to establish an extensive influence, superior to that of other Europeans; and that the danger and discredit arising from the forfeiture of this pre-eminence, could not be compensated by the temporary success of any plan of violence and injustice. That should any relaxation take place, without sufficient cause, in those principles of good government on the part of the directors themselves, it would bring upon them, in a heavier degree, the resentment of the legislative power of their country. That the conduct of the company, and their servants in India, in various instances specified, was contrary to policy and good faith; the company's servants, in their presidency of Bombay, had been guilty of notorious instances of disobedience to the orders of their employers, particularly in forming an alliance with Ragonah, or Ragonaut Row: that they had undertaken, without any adequate military force, or certainty of a sufficient revenue, and without proper communication with the superior government upon which they were to depend for sanction and support, to reinstate the

Company. usurper above mentioned, and thereby to involve themselves in a war with the ruling ministers of the Mahratta state, while Ragobah himself was not in the mean time able to give the company any secure possession of the grants he had made to them for the purchase of their assistance. That it was the opinion of the house, that all the disasters in which the British empire in the East were involved, had proceeded from the unjustifiable manner in which the Mahrattas had been treated, and the conduct of the Madras presidency in other respects specified. That it is the opinion of this house, that it must be reckoned among the additional mischiefs arising chiefly from the improvident war with the Mahrattas, that the military force of the Carnatic had been weakened by reinforcements sent to the Malabar coast: that the Bengal government had been under a necessity of supporting, on their confines, the army of a power confederated against them (A): that they had been under the necessity of suing for the mediation of the same power; had submitted to a refusal, and purchased at last an uncertain, because apparently an unauthorized, treaty, on most extravagant and dishonourable conditions, with Chimnaghee the rajah of Berar's son: and, finally, that being burdened with the expences of a variety of distant expeditions, while their allies were in distress, and their tributaries under oppression, there was also an alarming deficiency in the resources of revenue and commerce, by the accumulation of their debt, and the reduction of their infestment. That it was the opinion of the house, that an attempt made by the government-general, in the beginning of January 1781, to form an engagement of alliance, offensive and defensive, with the Dutch East India company, in the manner stated by the proceedings of their council, was unwarranted, impolitic, extravagant, and unjust.

These severe censures extended even to the directors themselves, whose conduct on some occasions was declared to be indefensible, as well as that of their servants and agents. It was also resolved, "That Warren Hastings, Esq; governor-general of Bengal, and William Hornsby, Esq; president of the council of Bombay, having in sundry instances, acted in a manner repugnant to the honour and policy of this nation, and thereby brought great calamities on India, and enormous expences on the India company, it was the duty of the directors to pursue all legal and effectual means for the removal of the said governor-general and president from their offices, and to recal them to Britain."

The commons having thus seriously entered into a consideration of East India affairs, soon found still more abundant reason for censure. It was discovered, that corruption, fraud, and injustice, had pervaded every department. It had become an object with the servants of the company to oppress the natives by every possible method. They monopolized every article of trade, and seemed to have no other principle of commerce but lawless violence: the Court of Directors sent out instructions; but for the most part without any effect. Though the delegated administration of

India ought to have preserved the strictest obedience to Company. that of Britain; yet, being at so great a distance from the seat of supreme authority, and being possessed of endless means of abuse, it had become corrupt in an extreme degree. Instead of being subservient to government at home, the administration of India affected independence. The maxims of Mr Hastings were arbitrary; and he seemed to have no inclination to obey. He treated with sovereign contempt the authority of the Court of Directors: and the confusion produced by the disputes between them were fostered by the body of India proprietors, who were disposed to act as a check upon the directors. The necessity of new regulations in the government of India was universally admitted; and a bill for this purpose was accordingly brought in by Mr Dundas. His propositions were, that the governor and council of Bengal should have a controuling power and jurisdiction over the inferior presidencies of India; and he was of opinion, that the governor-general should be invested with a power to act even against the will and opinion of the council, whenever he should imagine that, by so doing, he could contribute to the public good; though, in these cases, he alone should be responsible for the event. With regard to the inferior governors, though he did not think it proper that they should be authorized to act contrary to the advice of the council, he was of opinion, that they ought to have a right of negating every proposition, until application was made to the governor-general and council of Bengal. With regard to the Zemindaries, and other tenures of land, he observed, that when Hindostan had been conquered by the Moguls, a tribute was imposed upon the Zemindars; and while they continued to pay this tribute, they accounted themselves to be the real proprietors and masters of the lands they possessed. The people called *Ryots*, to whom these Zemindaries were let out, considered themselves likewise as secure in their possessions while they performed the articles of their respective contracts. Of late, however, these rights had been infringed; and the Mogul came to consider himself as the absolute master of all the soil of Indostan: which maxim he was inclined to destroy, and erect upon it another, that might secure the land-holders in their property. He proposed to secure the nabob of Arcot and rajah of Tanjore in their territories, by making an act of parliament in favour of the latter; but was of opinion, that the debts of these princes ought not to be too nicely inquired into, as the greatest part of them originated in corruption. He was clearly of opinion, however, that Governor Hastings ought to be recalled; and that steps ought to be taken to prevent the court of proprietors from presuming to act in contradiction to parliament. Lord Cornwallis appeared to be the most proper successor to Mr Hastings. His personal honour, and that of his ancestors, were pledges for his good behaviour; and being independent in his fortune, he could have no view of repairing his estate out of the spoils of India; and from his profession, he could add to the character of governor that of

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(A) The power here alluded to was Movdajee Boosla, Rajah of Berar. See INDOSTAN.

Company. commander in chief; he would not, however, insist on his name being filled up in the bill, as that would rest more properly with government.

Mr Hastings was defended by Governor Johnstone, who endeavoured to ridicule the arguments and proposals of Mr Dundas. He observed, to the honour of the former, that he had been able to conclude a peace with the Mahrattas; and while he enlarged on his talents for negotiation, he admired the resources with which he had supplied the expences of the war. It ought to be considered, that Mr Hastings was in a situation the most difficult, and that no man could have sustained it with more fortitude and ability. His enemies had dealt in insinuation and invective; but when the hour of trial came, they would find that their charges would be refuted with equal ease. He was defended also by Mr Dempster, who advised the house seriously to think before they passed a vote for the removal of Mr Hastings. His exertions had been extraordinary; and it would then be as ridiculous to supersede him, as it would have been to recal General Elliot, when the Spanish batteries were playing against Gibraltar. He was not, however, an advocate for all the measures of Mr Hastings; his errors might be numerous: but no censure of him should be established before they were pointed out and explained.

Mr Dundas having now obtained leave to bring in his bill, another was moved for by Sir Henry Fletcher, "That leave be given to bring in a bill to discharge and indemnify the united company of merchants trading to the East Indies, from all damages, interest, and losses, in respect to their not making regular payment of certain sums due to the public, and to allow farther time to such payment; to enable the company also to borrow a certain sum of money, and to make a dividend for the proprietors of four *per cent.* at midsummer 1783." He endeavoured to show, that the public had derived very considerable advantages from the company; that their dividend had been L. 8, 4s. annually during the time of peace, and L. 7, 15s. *per cent.* during war; they were by no means in a state of insolvency, as some members had endeavoured to prove, their present application proceeding only from a temporary embarrassment. A new dispute took place concerning Mr Hastings, who was warmly attacked by Mr Burke, and defended by Governor Johnstone. The former enlarged on the bloodshed, ravages, and rapacity, which had taken place in India. The established system of the servants of the company, he said, was rapine and robbery. The Mahratta war was occasioned by their refusal to be robbed; the famine at Madras was occasioned by the misconduct of the English government in India; and he set forth in strong colours the manner in which the Indian princes and princesses had been plundered. He instanced, that Mr Hastings had raised L. 800,000 in Bengal by private loan; and used it as an argument, that the company had ceased to exist, and that their commerce was nothing more than an instrument for procuring immense fortunes to individuals, totally destitute of conscience or principle.

All this was excused by Governor Johnstone. He regarded the sum of L. 800,000 as merely trifling, when the number of civil and military servants on the Bengal government was considered. The famine at

Madras was owing to the modes of war which prevailed in the East; as the enemy there marked their course by desolation. He concluded with censuring the manner in which Mr Hastings had been spoken of; and insisted that his high reputation ought to have guarded him from such insults. Mr Burke replied by an intimation of his design to impeach Mr Hastings on his return; whom he called the greatest delinquent that had ever violated in India the rights of humanity and justice.

It was observed by Lord John Cavendish, that the territorial acquisitions of the company were a fruitful source of grievance; and it would have been more for their advantage to have confined themselves to their original character of merchants. However, as the territorial acquisitions had been obtained, it was proper to take means for their preservation; as otherwise they would not revert to the natives, but fall into the hands of our natural enemies the French.

In the house of peers the cause of the company was ably defended by Earl Fitzwilliam. He maintained, that their situation was desperate, and bankruptcy inevitable, unless relief was instantly afforded. A report of their being in an insolvent state had gone abroad; and nothing was better calculated to preserve and support their credit than a large dividend sanctioned by act of parliament. The expenditure on their settlements had far exceeded their revenue; of consequence their servants had drawn bills, which they were unable to answer without a temporary supply. Thus the existence of the company might be said to depend on the bill; and he hoped no objections could be raised strong enough to destroy it.

On the 18th of November 1783, Mr Fox proposed his celebrated East India bill, which for some time attracted the attention of the nation at large in a very considerable degree. By this it was intended to take from the India proprietors and directors the entire administration of their territorial and commercial affairs. It took from them also their house in Leadenhall-street, together with all books, papers, and documents, vesting the entire management, the appointment of all officers and servants, the rights of peace and war, and the disposal of the whole revenue, in the hands of certain commissioners. These were, in the first instance, to be appointed by the whole legislature, but afterwards by the crown; and were to hold their offices by the same tenure as the judges in England, viz. during their good behaviour; and could be removed only by an address from one of the houses of parliament. They were required to come to a decision upon every question within a limited time, or to assign a specific reason for their delay. They were never to vote by ballot; and, almost in every case, were to enter the reason of their vote in their journals. They were also to submit, once every six months, an exact state of their accounts to the court of proprietors; and at the beginning of every session, a state of their accounts and establishments to both houses of parliament. Their number was limited to seven; but they were to be assisted by a board of nine persons, each of them possessed of L. 2000 company's stock; who, as well as the commissioners, were to be appointed in the first instance by parliament, and ever afterwards by the court of proprietors. They were also to be removeable at

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Company. the pleasure of any five commissioners, and were disqualified from sitting in the house of commons. The whole system of government thus proposed, was to continue for the space of three or five years.

This was accompanied with another bill, the professed design of which was to preclude all arbitrary and despotic proceedings from the administration of the company's territorial possessions. By this the powers of the governor-general and supreme council were ascertained more exactly than had hitherto been done; it deprived the governor-general of all power of acting independent of his council; proscribed the delegation of any trust; and declared every British power in the East incompetent to the acquisition or exchange of any territory in behalf of the company, to the acceding to any treaty of partition, the hiring out of the company's troops, the appointing to office any person removed for misdemeanour, or to the hiring out any property to a civil servant of the company. By this also monopolies were entirely abolished; and illegal presents recoverable by any person for his sole benefit. The principal part of the bill, however, related to the Zemindars, or native landholders, who were now to be secured by every possible means in the possession of their respective inheritances, and defended in all cases from oppression. Lastly, a mode was presented for terminating the disputes between the nabob of Arcot and the rajah of Tanjour; disqualifying every person in the service of the company from sitting in the House of Commons during his continuance in their service, and for a certain specified time after his demission.

During the course of the debates on this bill, Mr Fox set forth the affairs of the company as in the most desperate situation. They had asked leave, he said, the year before, to borrow L. 500,000 upon bonds; had petitioned for L. 300,000 in exchequer bills; and for the suspension of a demand of L. 700,000 due to government for customs. He took notice also, that, according to an act of parliament still in force, the directors could not, by their own authority, accept bills to the amount of more than L. 300,000; under which circumstances it would no doubt surprise the house to be informed, that bills were now coming over for acceptance to the amount of L. 2,000,000. It was evidently, therefore, and indispensably necessary, that government should interfere in the affairs of the company to save them from certain bankruptcy. He stated their actual debt at no less than L. 11,200,000. while their stock in hand did not exceed L. 3,200,000. There was therefore a deficiency of L. 8,000,000; a most alarming sum when compared with the company's capital. Unless speedily assisted, therefore, they must inevitably be ruined; and the ruin of a company of merchants so extensive in their concerns, and of such importance in the eyes of all Europe, could not but give a very severe blow to the national credit. On the other hand, the requisite assistance was a matter of very extensive consideration. It would be absolutely necessary to permit the acceptance of the bills to the above mentioned amount; and to do this without regulating their affairs, and reforming the abuses of their government, would only be to throw away the public money.

The conduct of the company's servants, and of the

company itself, was now arraigned by Mr Fox in the most severe terms; and their misconducts were pointed out under the following heads:

1. With regard to Mr Hastings.—The chairman of the committee had moved in the house of commons, that it was the duty of the company to recall that gentleman; to which motion the house had agreed. In obedience to this resolution, the directors had agreed that Mr Hastings should be recalled: but supposing this to be a matter rather beyond their jurisdiction, they had submitted their determination to a court of proprietors, who rescinded the resolution of the directors; and after this the whole affair came to be laid before the house of commons. In the mean time every thing was anarchy and confusion in the East, owing to this unsettled conduct with regard to the governor; as the whole continent had been made acquainted with the resolution of the house for recalling him, while that of the proprietors for continuing him in his office was kept a secret. The proprietors had also been guilty of another contradiction in this respect, as they had voted their thanks to Mr Hastings for his conduct in India. Hence Mr Fox was led to comment on the nature of the company's connections with their servants abroad, as well as on the character of the company themselves. Among the former, he said, there were a few, who, being proprietors themselves, endeavoured to promote the trade of the company, and increase its revenues. The views of the rest were otherwise directed; and from the difference in speculation between the two parties, the former were inclined to support that governor who enabled them to make large dividends; and who, for that reason, after having speculated for his own advantage, was obliged to do the same for the benefit of the proprietors. The latter, therefore, could not better gratify their wishes, than by supporting a governor who had in his power so many opportunities of providing for his friends.

2. The next charge was against the servants of the company, whom he accused of a regular and systematic disobedience to the orders of the proprietors.—The supreme council of Bengal, he said, had resolved, in opposition to Mr Hastings, to send two gentlemen, Mr Fowke and Mr Bristow, the one to reside with the nabob of Oude, the other at Benares. Mr Hastings, however, refused to send them: the directors transmitted the most positive orders to carry the vote of the supreme council into execution; but still Mr Hastings disobeyed; alleging in his defence, that he could not employ persons in whom he had no confidence. Afterwards, however, Mr Hastings seemed to contradict himself in a very curious manner. He granted Mr Fowke a contract, with a commission of 15 per cent.; which, he observed, was a great sum, and might operate as a temptation to prolong the war. "But (added he) the entire confidence I have in the integrity and honour of Mr Fowke, amounts to a full and perfect security on that head."

To this Mr Fox added some other instances of a similar kind; but though he supported these and the projected bill with all the argument and eloquence for which he is so remarkable, he found it impossible to make his scheme agreeable to the majority of the house. The strongest opponent was Mr William Pitt, who

Company. who insisted chiefly on the two following topics. 1. Its infringement, or rather annihilation of the company's charter; and, 2. The new and unconstitutional influence it tended to create.—He owned indeed, that India stood in need of a reform, but not such a one as broke through every principle of justice and reason. The charter of the company was a fair purchase from the public, and an equal compact for reciprocal advantages between the proprietors and the nation at large; but if it was infringed in the manner proposed by the bill, what security could other trading companies have that they should not be treated in the same manner? nay, what security could there be for Magna Charta itself? The bill, he said, amounted to a confiscation of property. It had been suggested indeed, that it was not a bill of disfranchisement, because it did not take from the proprietors their right to an exclusive trade; but this was not the only franchise of the proprietors. A freehold might have a franchise annexed to it, the latter of which might be taken away, and yet the property of the former remain; in which case it could not be denied that the freeholders would have great cause to complain. The case was exactly parallel with the India stock. Persons possessed of this to a certain amount, were intitled to a vote upon every important question of the company's affairs; and on this account the purchase-money was more considerable. But, by the bill in question, this privilege was to be taken away; which plainly amounted to a disfranchisement.

The great objection to this bill, however, seemed to be a suspicion that it was a scheme of Mr Fox to gratify his own personal ambition as a minister, he being at that time secretary of state. On this account he was deserted even by the patriotic members, who, upon former occasions, had so strenuously supported his cause.—Mr Dundas accused him of attempting to create a fourth estate in the kingdom, the power and influence of which might overturn the crown and subvert the constitution of Britain. A petition was presented from the proprietors, and another from the directors of the company, representing the bill as subversive of their charter, and confiscating their property, without either charge of delinquency, trial, or conviction. They prayed, therefore, that the acts of delinquency presumed against them might be stated in writing, and a reasonable time allowed them to deliver in their answer; and that they might be heard by counsel against the bill. About the same time the directors gave in a state of the company's affairs, differing in the most extraordinary manner from that given by Mr Fox. In this they represented the creditor side of the account as amounting to L.14,311,173, and they brought themselves in debtors to the amount of L.10,342,692; so that of consequence there was a balance in their favour of L.3,968,481. This was vehemently contested by the secretary, who said he could bring objections to the statement of the directors to the amount of more than L.12,000,000 Sterling. He then entered into a particular discussion of the articles stated in the directors account, and made good his assertion. Objections to his method of calculation, however, were made on the part of the company; so that nothing could certainly appear to the public but that the company were at that time much

distressed, and would fail entirely unless powerfully Company. supported by government.

Mr Fox now proceeded to a particular refutation of the arguments brought against the bill; in which indeed he displayed an astonishing force of argument and acuteness of reasoning. The objection drawn from the validity of the company's charter, he set aside, by showing that the company had abused their power, and that it was therefore necessary to take it from them. This he said always had been the case, and must be the case, in a free nation; and he brought the example of James II. who, on account of the abuse of his power, had been deprived of it by the nation at large. The case was the same with the company. They had made a bad use of their power, and therefore the nation at large ought to deprive them of it. It had been objected by the country gentlemen, that the bill augmented the influence of the crown too much; and by Mr Dundas, that it reduced it to nothing. Both these objections, he said, were overturned by the circumstance of making the commissioners hold their office only during good behaviour. Thus, when conscious that they were liable to punishment if guilty, but secure in case they faithfully discharged their trust, they would be liable to no seduction, but would execute their functions with glory to themselves, and for the common good of their country and of mankind. He then drew a comparison betwixt his own bill and that of Mr Dundas's already mentioned. The bill of the latter, he said, had created a despotic authority in one man over some millions of his fellow-creatures; not indeed in England, where the remedy against oppression was always at hand; but in the East Indies, where violence, fraud, and mischief, every where prevailed. Thus the bill proposed by Mr Dundas afforded the most extensive latitude for malversation, while his own guarded against it with every possible care; as was instanced in its confiding in no integrity; trusting in no character; and annexing responsibility not only to every action, but even to the *inaction* of the powers it created.

After having expatiated for a considerable time, the secretary was seconded by Mr Burke, whose force of oratory was chiefly directed, as indeed it usually has been when speaking of India affairs, on the monstrous abuse of the company's power in that quarter. He affirmed that there was not in India a single prince, state, or potentate, with whom the company had *come into contact*, whom they had not sold; that there was not a single treaty they had ever made which they had not broken; and that there was not a single prince or state that had ever put any confidence in the company who had not been ruined. With regard to the first article, Mr Burke instanced the sale of the Great Mogul himself; of the Rohillas; the nabob of Bengal; the polygars of the Mahratta empire; Ragobah the pretender to that empire; and the Subah of Decan.—The second article was proved by a review of the transactions from the beginning to the end of the Mahratta war. With regard to the third, viz. the ruin of such princes as put any confidence in the company or their servants, he desired them to look into the history and situation of the nabob of Oude. In the year 1779, this country had been visited by a famine; a calamity which had been known to relax the severity

Company. rity even of the most rigorous government: yet in this situation the president of Bengal had put an absolute negative upon the representation of the prince; adding, that perhaps expedients might be found for affording him a gradual relief; but their effects must be distant. This distant relief, however, never arrived, and the country was ruined.

Our limits cannot allow a particular detail of the charges against the company on the one hand, or the defences on the other. In general, it must appear, that such severe and heavy charges could not be advanced without some foundation, though perhaps they may have been considerably exaggerated by the orators who brought them. The picture drawn by Mr Burke on this occasion indeed was shocking. "The Arabs, Tartars, and Persians, had conquered Indostan with vast effusion of blood; while the conquests of the English had been acquired by artifice and fraud, rather than by open force. The Asiatic conquerors, however, had soon abated of their ferocity; and the short life of man had been sufficient to repair the waste they had occasioned. But with the English the case had been entirely different. Their conquests were still in the same state they had been 20 years ago. They had no more society with the people than if they still resided in England; but, with the view of making fortunes, rolled in one after another, wave after wave; so that there was nothing before the eyes of the natives but an endless prospect of new flights of birds of prey and passage, with appetites continually renewing for a food that was continually wasting. Every rupee gained by an Englishman in India was for ever lost to that country. With us there were no tributary superstitions, by which a foundation of charity compensated, for ages, to the poor, for the injustice and rapine of a day. With us no pride erected stately monuments, which repaired the mischiefs pride had occasioned, and adorned a country out of its own spoils. England had erected no churches, no hospitals, no palaces, no schools (the trifling foundation at Calcutta excepted); England had built no bridges, made no high-roads, cut no navigations, dug no reservoirs. Every other conqueror of every other description had left some monument either of state or beneficence behind him; but were we to be driven out of India this day, nothing would remain to tell that it had been possessed, during the inglorious period of our dominion, by any thing better than the ouran outang or the tiger!"

All this eloquence, however, was at present entirely ineffectual, and the bill was finally rejected: much confusion and altercation ensued, which terminated in a change of ministry and dissolution of parliament. On the 26th of May 1784 a petition from the company was presented to the house of commons, praying for such relief as the nature of their affairs might seem to demand. This was followed on the 24th of June by a bill for allowing the company to divide four *per cent.* for the half year, concluding with midsummer 1784. This having passed, after some debate, a new bill was proposed by Mr Pitt for relieving the company in the mean time, and regulating their affairs in time to come. A bill to this purpose had been brought in during the last session of the former parliament by the same gentleman, which he wished to bring to a comparison with that of Mr Fox, of which an ac-

count has already been given. In this bill he began Company. with laying it down as a principle, that "the civil and military government of India, or, in other words, the imperial dominion of our territories in the East, ought to be placed under other controul than that of the merchants in Leaden-hall street: and this controul could be no other than the executive branch of the constitution. The commerce of the company, however, ought to be left as free from restrictions as possible; and, lastly, capricious effects from the government of India upon the constitution of Britain, were to be carefully avoided. A controul in the executive branch of the legislature over the government of India had indeed been established by the regulation bill of 1773; but the former interference of ministers had not been beneficial, because it had not been active and vigilant. He now proposed, therefore, that a board should be instituted expressly for the purpose. This board was to be appointed by the king, and to consist of the secretary of state for the home department, the chancellor of the exchequer, and a certain number of the privy council. To this board the dispatches of the company were to be submitted, and were not to be sent to India until they were countersigned by them. To prevent questions concerning the commercial and political concerns of the company, it was proposed, that the dispatches upon the former subject should be submitted to the board; and that, in case of any difference, an appeal should be made to the king in council. Though he (Mr Pitt) had not thought proper to accept of the proposal of the company to yield the appointment of foreign councils to the crown, he was nevertheless clearly of opinion, that the commander in chief ought to be appointed by the king. He proposed also that this commander should have a vote in council next to the president; that the king should be empowered to bestow the reversion of his office; that the king might recal the governor-general, the presidents, and any members of their councils. He yielded the appointment of all officers, with the single exceptions he had stated, to the court of directors, subject, however, to the approbation of the king; and that, in case of a negative, the directors should proceed to a second choice, and so on. He deprived the court of proprietors of their privilege of rescinding or altering the proceedings of their court of directors; and with respect to the foreign government, he was of opinion, that their authority should comprise in it a considerable discretion, accompanied with the restraint of responsibility. He proposed, that there should be a revision of the establishments in India with a view to retrenchments; that appointments should take place by gradation; and that a new and summary tribunal should be erected for the trial of offences committed in that country. With regard to the Zemindaries, though he could not help paying a compliment to Mr Fox, on his intention of restoring them to their proper owners, he yet thought that a general and indiscriminate restitution was as bad as an indiscriminate confiscation. He therefore proposed, that an inquiry should be instituted for the purpose of restoring such as had been irregularly and unjustly deprived, and that they should in time to come be secured against violence.

In the bill of 1784 few alterations were made; and these

Company. these uniformly tended to enlarge the powers of the board of controul. They were permitted, in cases of emergency, to concert original measures, as well as to revise, correct, and alter those of the directors. In matters relative to peace or war, where secrecy was a principal object, they were allowed to send their orders directly to India, without any communication with the directors; to the commander in chief, without any communication with the presidencies; and the number of persons constituting the different councils of Bengal, Fort St George, and Bombay, was determined.—The governor-general and council of Bengal were to have an absolute power to originate orders to the inferior presidencies, in such cases as did not interfere with the directions already received from Britain; adding a power of suspension in case of disobedience. The supreme council were forbidden, unless any of the Indian princes should have first commenced or meditated hostilities, to enter upon war, or form an offensive treaty, without orders from home. The inferior councils were forbidden in all cases to form alliances; and in cases of urgency, were commanded to insert a provisional clause, rendering the permanency of the alliance dependent on the confirmation of the governor-general.

Various salutary regulations were proposed concerning the behaviour of the company's servants, against whom so great complaints had been made. Inquiry was ordered to be made by the different presidencies into the expulsions that might have been made of any of the hereditary farmers, and of the oppressive rents and contributions that might have been extorted from them; and measures were directed to be taken for their relief and future tranquillity. A similar examination was ordered into the different establishments in the Indian settlements; a report of which was to be laid annually before parliament. The company were prohibited from sending out a greater number of cadets of writers than what were absolutely necessary; and it was likewise provided, that the age of such as were sent out, should not be less than 15, nor more than 22 years. It was likewise provided, that promotions should be made in the order of seniority, unless in extraordinary cases; for which the presidencies should make themselves specifically responsible. Crimes committed by English subjects in any part of India, were made amenable to every British court of justice, in the same manner as if they had been committed in Britain. Presents, unless such as were absolutely ceremonial, or given to a counsellor at law, a physician, a surgeon, or a chaplain, were absolutely prohibited, under the penalty of confiscation of the present, and an additional fine at the discretion of the court. Disobedience of orders, unless absolutely necessary, and pecuniary transactions prejudicial to the interests of the company, were declared to be high crimes and misdemeanors. The company were forbidden to interfere in favour of any person legally convicted of any of the above crimes, or to employ him in their service for ever. The governors of the different presidencies were also permitted to imprison any person suspected of illicit correspondence, and were ordered to send them to England with all convenient speed. Every person serving, or who should hereafter serve in India, was also required, on his return to England, to give an exact account, upon oath, to the court of exchequer, of his property, within two

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months after his arrival; one copy of which was to be kept in the court of exchequer, and the other at the India-house. The board of controul, the court of directors, or any three of the proprietors whose stock should amount together to 1000*l.* were allowed to move the court of exchequer to examine the validity of the account. In case of an apparently well founded accusation, the court of exchequer were allowed to examine the party upon oath, and even to imprison him until the interrogatories proposed to him should be answered. The whole property of a person who should neglect to give in such an account within the time limited, or who should have been guilty of a misrepresentation in that account to the amount of 2000*l.* sterling, was ordered to be confiscated; ten *per cent.* to be paid to the accuser, and the remainder to be equally divided between the public and the company. Every person who had once been employed in India, but had afterwards resided in Europe for five years, unless such residence had been expressly on account of his health, was declared incapable of ever being sent out to India again.

As a farther curb on the company's servants, the attorney-general or court of directors was authorized to file an information in the court of King's-bench against any person for crimes committed in India. That court was empowered also to imprison or admit the accused to bail immediately. It was then ordered, that within 30 days a certain number of peers should be chosen by the house of lords, and of the members of the house of commons by that house, to constitute a court for the trial of the accused. The court was finally to consist of three judges appointed by the crown, four peers, and six members of the house of commons; and the accused had a right to a preremptory challenge. From this court there was no appeal; and it was empowered to adjudge the party incapable of ever serving the company; to punish by fine or imprisonment; and in order to proportion the fine to the property of the convict, the court of exchequer might, at the requisition of the attorney-general, or of the company, examine him upon oath concerning the sum he was worth. A refusal to answer was to be punished with confiscation of property, and imprisonment during pleasure.

With regard to the treatment of delinquents in India, Mr Pitt observed, that at that time we had it not in our power to punish them. Either a new process must therefore be instituted, or offences, equally shocking to humanity, and contrary to every principle of religion and justice, must be permitted to continue unchecked. Every person therefore who went hereafter, would know the predicament in which he stood; and would understand, that by so doing he agreed to give up some of the most valuable privileges of an Englishman: yet in this he would do no more than a very numerous and honourable body of men, the military, did daily, without the least hesitation, or the smallest impeachment of their character.

This bill, so tremendous in its appearance to the company's servants, was vehemently opposed by the minority. Mr Francis observed, that it went upon two principles, viz. the abuse of power abroad, and the want of it at home. To remedy these, Mr Pitt had proposed to augment the power abroad, and to

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Company. diminish that at home. He condemned the unlimited power of the commissioners, and even pretended to suppose that there must have been some mistake in the structure of the clause; it being impossible to think that it was intended to set aside the directors at home and the government abroad, in order to throw the whole power into the hands of a military commander. Though he approved of the clause by which schemes of conquest and extension of territory were condemned, he remarked, that it was essentially defective in other respects; as alluding to facts and offences which were not described, and to criminals whom, so far from punishing, it did not venture to describe. With respect to the affair of presents, he confessed that his opinion was rather singular. He was for an unlimited prohibition to men in high stations; but in the ordinary transactions of business, he was of opinion that they were useful, without giving room for any just apprehensions. The government of India, as it was now constituted, was a government of favour, and not of justice; and nothing would be done for the natives unless the persons who forwarded their affairs were gratified. In the mean time, however, the exception in favour of presents of ceremony was founded upon ideas which he knew to be fallacious, and was even calculated to render the prohibition itself useless and ineffectual. For the purpose of receiving presents of ceremony, all occasions would be sufficiently solemn. He warmly censured also the power of imprisonment given to the respective presidencies, and he condemned the institution of the new court of judicature as unnecessary, arbitrary, and dangerous.

By Mr Fox the bill was so highly disapproved of, that he objected to the house going into a committee upon it. He endeavoured to show, that instead of diminishing, it was calculated to increase the calamities of the East; and instead of reforming, to perpetuate the abuses so much complained of. The board of controul, he said, provided for a weak government at home by a division of power; and if there were a receipt or a nostrum for making a weak government, it was by giving the power of contriving measures to one, and the nomination of the persons who were to execute them to another. The negative given to the commissioners operated as a complete annihilation of the company, and the chartered rights so much vaunted of. The bill was a scheme of dark and delusive art, and took away the rights of the company by slow and gradual sap. The first step was originally to contrive measures without the knowledge of the company; and the next, to convey orders secretly to India, at the very time perhaps that the commissioners were openly giving countenance to orders of a quite different tendency sent from the directors. With regard to the new tribunal, he considered it as in truth a screen for delinquents; since no man was to be tried but on the accusation of the company or of the attorney-general; in which case he had only to conciliate government in order to remain in perfect security.

The opposition of Mr Fox's party against this bill proved as fruitless as their efforts had been in favour of the other. The house divided on the speaker's leaving the chair; when the motion was carried by a majority of 215. Still, however, all parts of the bill were warmly debated. In the course of conversation

upon this subject, Mr Dempster expressed a wish that Company; the king could be requested to send over one of his sons to become sovereign of that country. We might then enter into a federal union, and enjoy all the benefits that could be derived from the inhabitants of the East by Europeans, viz. those of commerce. The clauses relative to the native princes and hereditary farmers were all withdrawn at the motion of Mr Dundas; and under the head of presents, the exception in favour of those of ceremony was withdrawn. That clause, which insisted on all persons returning from India to give an account of the value of their estates upon oath, was severely censured by Mr Dempster and Mr Eden; and after some debate was entirely withdrawn, as was also the idea of making the person take the oath when required by the board of controul. Mr Pitt then proposed, that persons who had passed five years in India, and accumulated no more than L. 5000 for that time, or double that sum for the next five years, should be exempted from all prosecution on the score of their fortunes. But on a suggestion by Mr Atkinson, that, in case of sickness, it might not be practicable for a person arriving from India to give in an account upon oath in the space of two months; on which suggestion, a power was granted to the court of exchequer for extending the term from time to time as they should think proper. It had been the original idea of the chancellor, that this jurisdiction should take place in twelve months; and it had been objected, that thus persons would be deprived of the trial by jury, without time being granted them to choose whether they would submit to the condition. Mr Pitt now moved, that no account upon oath should be required of any person who should arrive from India before the first of January 1787. This amendment was likewise censured by opposition, as holding out an indemnity to speculators, and a warning for them to return within the assigned period. It was remarked by Mr Sheridan, that by the bill before the house, a person who took the oath would be liable all his lifetime to a prosecution for perjury. He could therefore make no settlement of his fortune; he could not sell or mortgage his estate, as nobody would have any thing to do with a property which was still liable to contest and forfeiture. This representation produced another amendment, limiting the commencement of a prosecution to the period of three years. The clause prohibiting the return of any person to India under certain conditions, was also mitigated by two amendments from the chancellor; one of them exempting the officers of the king from its operation; and the other permitting the restoration of any person with the consent of the directors, and three-fourths of the court of proprietors.

With these amendments the bill finally passed the house of commons on the 28th of July. On being carried up to the house of lords, it met with a very vigorous opposition; the principal speakers against it being Lord Stormont and the Earl of Carlisle. The former animadverted upon the principle of seniority established by it; which he said was particularly ill-suited to the critical posture of affairs and our present situation in India; and he asserted, that had such a clause been in effect at the time that Lord Clive first entered into the company's service, there would not have

Company. have been an inch of the territorial possessions at present belonging to this country. It would damp the ardour of emulation, check the rising spirit of the youth now in Asia, and that at a time when the most extraordinary talents were necessary to raise us from our inauspicious and ruined condition. He objected also to the power of recal in the board of controul; which, he said, was by no means a sufficient check upon the company's servants in India. The distance of time and place, he said, were so great, that a recal from India could not have the least effect. But these remonstrances had very little weight with the house; the bill being finally passed on the 9th of August.

Some years after this, however, a declaratory law was found necessary, in consequence of a controversy which had arisen between the board of controul and the company. It had been resolved, in the month of October 1787, when his Majesty had reason to be alarmed, and to look with more than common anxiety to the safety and preservation of every part of the British dominions, to send out four additional regiments for the better protection of our Indian possessions; nor was the design taken up as a temporary, but with a view to a permanent establishment of his Majesty's troops in India. At that time, no unwillingness to receive the regiments on board the company's ships, and provide for their support in India, had been intimated by the court of directors; but, on the contrary, the measure had been considered as a wise one, and the suggestion of it had given universal satisfaction. Since, however, the threatening storm had been dispersed, far different sentiments prevailed. Some of the directors, at least, were of opinion, that unless they made a requisition to government for further military assistance, they had it in their option to bear, or to refuse to bear, the expence of any additional regiments of his Majesty's army which might be sent to India; and this opinion seemed to be, in a great measure, grounded on the act of 1781, by which the East India company were bound to pay for such of his Majesty's troops as had, by their requisition, been sent to India. This idea had been much agitated without doors, and the directors had thought proper to consult different counsel of eminence on the subject.

In this business two questions naturally arose—First, Whether the king had a right to send his troops to any part of his dominions? and, secondly, If he sent them to India, who ought to defray the expence? That his Majesty had an undoubted right, by his royal prerogative, to direct the distribution of his army, no one could, with any colour of reason, dispute. The only point, therefore, which offered itself for discussion was, whether, if his majesty, by virtue of his prerogative, thought proper to send four additional regiments to India, the expence of sending them, and their support, ought to be provided for out of the revenues of India, which they protected? It was certainly the opinion of ministers, that by the act of 1784, the authority and power of the court of directors, touching the military and political concerns of India, and also the collection, management, and application of the revenues of the territorial possessions, was transferred to the board of controul, which might direct the appropriation of these revenues in the manner that to them

should appear to be most for the public advantage; Company. but as doubts had been entertained by others, and the opinions of counsel, confirming those doubts, had been taken, all of which had gone abroad into the world, it was considered as a necessary measure to call upon the different branches of the legislature to remove those doubts in the most effectual way by a bill. It was certainly very evident, that, on the present occasion, the four regiments might, on board the company's ships, be sent out to India at a very inconsiderable expence; whereas, if transports had been specially provided for that purpose, the expence must have been enormous. To oblige the company, therefore, to pay the expence out of their Indian revenues, as had already been intimated to them by the commissioners of controul, the chancellor of the exchequer moved, on the 5th of February 1788, "That leave be given to bring in a bill for removing any doubts respecting the power of the commissioners for the affairs of India."

In explanation of this bill, and in answer to the remarks of opposition, Mr Pitt desired to remind the house that he had provoked the discussion of the bill, and had earnestly solicited them to bring it to the test of the most severe and scrupulous investigation. He found that it would be disputed, whether by the act of 1784 the board of controul had any right of superintendence over the revenue? Would it be contended that parliament meant to leave the finances in the hands of the company, who had been declared unfit to be trusted with them? Was it likely, that, when they provided for the better management of the political and military concerns, they had paid no attention to the circumstance upon which these concerns inseparably depended? The board of controul had already proceeded to reduce the enormous establishments in India; their right of interference in that respect had never been questioned; and what indeed would be the consequence of denying this right? The court of directors, if they had it in their power, as the expiration of their charter drew near, and it was doubtful whether their monopoly would be renewed, would certainly make it their first object to swell the amount of their imports, and would neglect the care of the territorial and political state of India. The duty of administration was to look, first, to the prosperity and happiness of the natives; secondly, to the security of the territorial possessions; thirdly, to the discharge of the debts due to the persons who had advanced their money, and enabled the company to struggle with their late difficulties; and, in the last place, to the commercial benefit of the proprietors. Was it probable that the court of directors would act upon that scale? Could it have been intended to confide in their discretion? It had been said, that the powers attributed to the board of controul were the same in substance as had before been given to the secretaries of state and the lords of the treasury. But the fact was otherwise. The court of directors had been obliged to communicate their dispatches previous to their going to India; but there was no obligation upon the secretary of state to give any directions concerning them. The responsibility had ordinarily rested, under the former government, with the court of directors; under the present it was wholly vested with the board of controul.

Company.

An objection had been stated, that the declaratory bill conveyed to the king the power of maintaining an army without the consent of parliament. No proposition (Mr Pitt observed) could be more adverse to his intentions than that which was thus imputed to him. But in reality the troops in question had already been recognised by parliament when they voted the estimate for raising them; and the number of king's regiments serving in India would always be to be ascertained by the company belonging to each, which remained in England for the purpose of recruiting, and the expence of which would be to be provided for by parliament.

Mr Pitt acknowledged, that it had been the object of the act of 1784 to assume the power of superintendence and controul, without assuming the power of patronage. In the present bill he declared, that every thing had been done which his understanding had suggested for the diminution of patronage. The regiments in question belonged to the crown; and of course it could not be supposed that the sovereign could entirely depart from his prerogative of naming his own officers. But the king had acted with the most gracious attention to the company, and to the merits of the officers who had grown grey in their service; having relinquished nearly half the patronage of the regiments, and leaving the disposal of these commissions to the court of directors. The company indeed alleged that they had 600 officers unemployed; but the king could not forget that he had 2800 officers upon half-pay, not perhaps more meritorious, but certainly not less so, than those in the company's service, and many of whom had actually served with distinction in India. Such had been the forbearance he had thought it proper to exercise upon the subject of patronage. But if, by the objection that had been started, it was intended to refer to the great political patronage, this he did not deny that he had at all times intended to assume. Men who were responsible for the government of a country, ought undoubtedly to have the appointment of those whom they were to entrust with the execution of their orders. But it would be admitted that the patronage left to the company was very considerable, when the great extent of their military establishment was properly recollected. Mr Pitt added, that the objections that were started on this head would possibly throw difficulties in the way of the consolidation of the two armies in India; an object on many accounts desirable, and which in some way or other must be attempted. If it should be thought advisable to make the whole army royal, then undoubtedly the patronage of the crown would be greatly increased. He believed, however, that the measure was necessary; and there was scarcely any thing to which he would not assent, to remove the apprehensions of the nation respecting the undue use of this patronage. For the bill now before the house, Mr Pitt professed himself ready to propose clauses that should annihilate every suspicion of danger.

The speech of Mr Pitt produced a favourable effect upon the country gentlemen; and the clauses which he had alluded to being moved, were received without any debate. These provided, That no king's troops, beyond the number which was now proposed, should be sent to India under the authority of any existing law:

That no increase of salary should be given to any of the servants of the company, without the dispatches for that purpose being laid before both houses of parliament thirty days previous to their being sent; and that no gratuity should be given, the proposal for which did not originate with the court of directors. A fourth clause was added to these by the minister, which had not precisely the same object: it directed, that an account of the revenues and disbursements of the company should be laid before parliament at a certain assigned period in the course of every year.

The bill was carried up to the house of lords on the 14th of March, read a first time on the following day, which was Saturday, and proposed for a second reading on the ensuing Monday. This precipitation was made the subject of a petition, offered by certain proprietors, and presented to the house by the Duke of Norfolk, in which they requested a delay of three days, till a general meeting could be held of the proprietors of the East India company. To this suggestion it was objected by Lord Thurlow and Lord Hawkesbury, that the ships of the East India company were now detained in port at the enormous expence of three or four hundred pounds *per diem*. By Lord Stormont and Lord Loughborough it was replied, that no expence, however great, ought to weigh in the consideration of the present question. The bill decided upon a matter of private right, and parliament could not justly refuse to hear the petitioners. The house divided upon the question, contents 32, not contents 75. A motion of Lord Porchester was rejected by a similar majority, for referring a question to the twelve judges respecting the true meaning and intent of the act of 1784.

The Duke of Richmond said, that he was peculiarly circumstanced on the present occasion, since he had never been pleased with any of the bills for the government of India that had yet been brought into parliament. He had ever been of opinion, that the concerns of the East were trusted in the best hands when they were vested in the company itself. He had opposed the bill of 1783, because it flagrantly violated the charter of the company, and placed an immense power in the hands of a commission, that was not responsible, so far as he could find, either to the king or the parliament. He had opposed the act of 1784, because it gave to the crown an enormous addition of power. But he could not admit that that act was in any degree so violent and despotical as the bill which preceded it. The declaratory measure now under consideration must necessarily have his complete approbation. It consisted of two distinct parts; its exposition of the act of 1784, and certain enacting clauses containing checks and restraints upon the extensive patronage that the government of the East naturally gave. To the former part he must inevitably agree. That the act of 1784 gave to the board of controul complete authority, had always been his opinion. For that reason he had opposed it: but, entertaining that opinion, he must justify the present bill, which in his mind was a true declaration of the fact. He could not but equally approve of the restraints that were proposed upon the exercise of patronage. Patronage was inseparable from power. But when he saw the in-

Company. industry with which it was limited, and ministers were tied down from the abuse of it; when he saw that it was not to be used otherwise than for the good of the service, he could not view the present measure with the same jealousy with which he was accustomed to regard propositions for extending the power of the crown.

The bill, however, underwent a severe discussion in this as it had done in the other house; but at length passed.

In May following a petition was presented to the house of commons by the company, stating certain pecuniary embarrassments which they apprehended to take place on the first of March 1790, owing to the arrears of the war, to the government claim of L. 500,000, to the debt incurred in China, and to the advances necessary to be made for the purposes of the China trade. In compliance with their petition, Mr Pitt moved on the following day that they should be empowered to borrow a sum not exceeding L. 1,200,000. He at the same time observed, that in all probability the company in 1791 would have upwards of L. 3,000,000 Sterling more than sufficient to discharge their debts. The measure was carried through both houses without opposition.

3. *Hudson's Bay Company.* The vast countries which surround Hudson's Bay abound with animals whose furs and skins are excellent, being far superior in quality to those found in less northerly regions. In 1670, a charter was granted to a company, which does not consist of above nine or ten persons, for the exclusive trade to this bay; and they have acted under it ever since with great benefit to themselves. The company employ four ships and 130 seamen. They have several forts, viz. Prince of Wales's fort, Churchill river, Nelson, New Severn, and Albany, which stand on the west side of the bay, and are garrisoned by 186 men. The French, in May 1782, took and destroyed these forts, and the settlements, &c. valued at 500,000l. They export commodities to the value of 16,000l. and bring home returns to the value of 29,340l. which yield to the revenue 3734l. This includes the fishery in Hudson's Bay. This commerce, small as it is, affords immense profits to the company, and even some advantages to Great Britain in general; for the commodities we exchange with the Indians for their skins and furs, are all manufactured in Britain; and as the Indians are not very nice in their choice, such things are sent of which we have the greatest plenty, and which, in the mercantile phrase, are drugs with us. Though the workmanship too happens to be in many respects so deficient that no civilized people would take it off our hands, it may be admired among the Indians. On the other hand, the skins and furs we bring from Hudson's Bay, enter largely into our manufactures, and afford us materials for trading with many nations of Europe to great advantage. These circumstances tend to prove incontestably the immense benefit that would redound to Great Britain, by throwing open the trade to Hudson's Bay, since even in its present restrained state it is so advantageous. This company, it is probable, do not find their trade so advantageous now as it was before we got possession of Canada. The only attempt made to trade with La-

brador has been directed towards the fishery, the annual Company. produce of which exceeds 49,000l.

THE above are the principal trading companies presently subsisting in Great Britain; but to the number might have been added one of vast importance, the *Scotch Darien Company*, had it not been for the crooked and pusillanimous policy of the English ministry at the time. For an account of which, see the article *DARIEN*.

Greenland COMPANY. See *GREENLAND*.

Banking COMPANIES. See *BANK*.

OF establishments similar to the above in other countries, the following, belonging to the Dutch and French, may be mentioned as the most important.

1. *DUTCH Companies.* 1. Their East India company had its rise in the midst of the struggle which that people had for their liberty: for the Spaniards having forbidden all commerce with them, and shut up all their ports, necessity inspired some Zealanders to seek a new north-east passage to China.

This enterprize proving unsuccessful to three several armaments in 1594, 1595, and 1596, a second company was formed, under the name of the *Company of remote Parts*: which, in 1597, took the ordinary route of the Portuguese to the Indies, and returned in two years and a half's time with little gain but good hopes.

This company, and a new one just established at Amsterdam, being united, equipped other fleets; and these occasioned other companies at Amsterdam, Rotterdam, in Zealand, &c. insomuch that the states soon began to apprehend they might be prejudicial to each other. Under this concern, they called all the directors of the several companies together, who all consented to an union, the treaty whereof was confirmed by the states in 1602; a very remarkable epocha, as being that of the most solid and celebrated establishment of commerce that ever was in the world.

Its first capital was six millions six hundred thousand guilders. It had sixty directors, divided into several chambers; twenty in that of Amsterdam, twelve in that of Zealand, fourteen in that of Delft and Rotterdam, and a like number in those at Sluys and Horn. As each grant expires, the company is obliged to procure a new one, which it has already done five times since the first, paying a considerable sum each time. The last application was in 1773, when the company, after stating that its trade had declined, solicited the states-general to grant a diminution of the sum formerly paid for the renewal of the charter. Upon this representation, their high mightinesses, in order to have time to inquire into the matter, prolonged the charter for three years, upon the old establishment; and finding, upon examination, that the company had really sustained great losses, and its trade considerably declined, they acted with the spirit of a wise commercial commonwealth, by complying with the company's request. They therefore, in 1776, granted them a new charter for 30 years, on the same terms as the former, on the immediate payment of 2,000,000 of florins, instead of 3,000,000 which they paid before, and the sum of 360,000 florins yearly; which annual pay-

Company. payment they were allowed to make either in money or merchandize. In consequence of this indulgence, the stock of the company rose in a short time no less than 19 per cent.

Their factories, residences, &c. in the East Indies, are very numerous; reaching from the Persian gulph to the coast of China: the principal is that of Batavia, the centre of their commerce: here resides their general, with the state and splendor of a sovereign prince: making war and peace with the eastern kings and emperors at pleasure.

The other more considerable factories are, Taiouam on the coast of China, Nangisac in Japan, Malacca, Surat, Amboyna, Banda, Siam, Moluccas, &c. several on the coast of Coromandel, and at Ispahan, Cape of Good Hope, &c. in all, they number 40 factories and 25 fortresses. They have the whole trade of the spicery in their own hands.

2. Their *West India Company* was established in 1621, with an exclusive privilege to trade 24 years along the coasts of Africa, between the tropic of Cancer and the Cape of Good Hope; and in America from the south point of Newfoundland, through the straits of Magellan, that of Le Taire, or others, to the straits of Anian, both in the North and South Sea. The directors are divided into five chambers (as in the East India company), out of which 19 are chosen for the general direction of affairs. In 1647, the company renewed its grant for 25 years; but it was scarce able to hold out the term, on account of its great losses and expences in taking the bay of Todos los Santos, Fernambuc, and the greatest part of Brasil, from the Portuguese. The weakness of this company, which had several times in vain attempted to be joined to that of the East Indies, occasioned its dissolution at the expiration of its grant.

In 1674, a new company, composed of the ancient proprietors and their creditors, was settled in the same rights and establishment with the former; and still subsists, though considerably decayed. Their first capital was about six millions of florins. Its principal establishments are, one at Cape Verd, another on the Gold Coast of Africa, at Tobago, Curassao, &c. in America.

II. FRENCH Companies. 1. Their *East India Company* was established in 1664, with an exclusive privilege to trade for 50 years in all the seas of the East Indies and South Sea. No adventurer to be admitted without 1000 livres in stock; and foreigners who have 20,000 livres in stock to be reputed regnicoles.

The patent grants them the island of Madagascar; and the king to be at one-fifth of the expence of the three first armaments, without interest: the principal to be refunded in ten years; or, if the company find it loses on the whole, the loss to fall on the king's side.

The capital fund of the company, which was mostly furnished by the king, was seven or eight millions of livres, but was to have been fifteen millions.

In effect, though no means were wanting to support the company, yet it still drooped and still struggled; still having subsisted ten years without any change in its form, and being no longer able to discharge its engagements, there were new regulations concerted, but

to little purpose. At length, things not being disposed for a new East India company, nor much good to be expected from the old one, in 1708 the ministry allowed the directors to treat with the rich traders of St Malo, and resign to them their privilege under certain conditions. In the hands of these last, the company began to flourish. See *India Company*, below.

Its chief factory is at Pondicherry, on the coast of Coromandel. This is the residence of the director-general; the other factories are inconsiderable. The merchandizes which the company brings into France are, silks, cottons, spices, coffee, rice, saltpetre; several kinds of gums and drugs, wood, wax, printed calicoes, muslins, &c.

2. Their *West India Company* was established in 1664. Their charter gave them the property and seignory of Canada, Acadia, the Antilles islands, Isle of Cayenne, and the Terra Firma of America, from the river of the Amazons to that of Oroonoko; with an exclusive privilege for the commerce of those places, as also of Senegal and the coasts of Guinea, for 40 years, only paying half the duties. The stock of the company was so considerable, that in less than six months 45 vessels were equipped; wherewith they took possession of all the places in their grant, and settled a commerce: yet this only subsisted nine years. In 1674, the grant was revoked, and the countries above reunited to the king's dominions as before; the king reimbursing the actions of the adventurers. This revocation was owing partly to the poverty of the company, occasioned by its losses in the wars with England, which had necessitated it to borrow above a million, and even to alienate its exclusive privilege for the coasts of Guinea: and partly to its having in good measure answered its end; which was to recover the commerce of the West Indies from the Dutch, who had torn it from them: for the French merchants, being now accustomed to traffic to the Antilles, by permission of the company, were so attached to it, that it was not doubted they would support the commerce after the dissolution of the company.

3. Their *Mississippi Company* was first established in 1684 in favour of the Chevalier de la Salle; who having projected it in 1660, and being appointed governor of the fort of Frontignac at the mouth of that river, travelled over the country in the year 1683, and returned to France to solicit the establishment. This obtained, he set sail for his new colony with four vessels laden with inhabitants, &c. but entering the Gulph of Mexico, he did not, it seems, know the river that had cost him so much fatigue, but settled on another river unknown, where his colony perished by degrees; so that in 1685 there were not 100 persons remaining. Making several expeditions to find the Mississippi, he was killed in one of them by a party who mutinied against him; whereupon the colony was dispersed and lost. M. Hiberville afterwards succeeded better. He found the Mississippi, built a fort, and settled a French colony there; but he being poisoned, it is said, by the intrigues of the Spaniards, who feared such a neighbour, in 1712 M. Crozat had the whole property of trading to the French territories called *Louisiana* granted him for 15 years.

4. *Company of the West.* In 1717, the Sieur Crozat surrendered his grant; and in the same year a new

Company. company was erected under the title of *Company of the West*: to which, besides every thing granted to the former company, was added the commerce of beaver, enjoyed by the Canada company from the year 1706, but expiring in 1717. In this establishment, an equal view was had to the finances and the commerce of the nation; and, accordingly, part of the conditions of its establishment regarded the settling a colony, a trade, &c. the other the vending part of the bills, called *bills of state*, which could no longer subsist on their present footing. The former are no more than are usual in such establishments: for the latter, the actions are fixed at 500 livres, each payable in bills of state; the actions to be esteemed as merchandize, and in that quality to be bought, sold, and trafficked. The bills of state, which make the fund of the actions, to be converted into yearly revenue. To put the finishing hand to the company, in 1717 its fund was fixed at an hundred millions of livres; which being filled, the cash was shut up.

5. *India Company.* The junction of the former company with that of Canada was immediately followed by its union with that of Senegal, both in the year 1718, by an arret of council: which at the same time granted the new company the commerce of beavers, and made it mistress of the negro or Guinea trade to the French colonies in America.

Nothing was now wanting to its perfection but an union with the East India company, and with those of China and St Domingo; which was effected, with the two first in 1719, and with the third in 1720. This union of the East India and China company with the company of the West, occasioned an alteration of the name; and it was henceforth called the *India Company*.

The reasons of the union were, the inability of the two former to carry on their commerce; the immense debts they had contracted in the Indies, especially the East company, complaints whereof had been sent to court by the Indians, which discredited the company so that they durst not appear any longer at Surat; the little care they took to discharge their engagements; and their having transferred their privilege to the private traders of St Malo, in consideration of a tenth in the profits of the returns of their ships.

The ancient actions of the company of the West, which were not at par when this engraftment was projected, before it was completed, were risen to 300 *per cent.*; which unexpected success gave occasion to conclude the new actions of the united companies would not bear less credit. The concourse of subscribers was so great, that in a month's time there were above fifty millions subscribed for: the first twenty-five million actions which were granted to the India company, beyond the hundred millions of stock allowed the company of the West, being filled as soon as the books were opened; to satisfy the earnestness of the subscribers, the stock was increased by several arrets to three hundred millions. Credit still increasing, the new actions rose to 1200 *per cent.* and those of the ancient company of the West to 1900 *per cent.*; an exorbitant price, to which no other company ever rose. Its condition was now so flourishing, that in 1719 it offered the king to take a lease of all his farms for nine years,

at the rate of three millions five hundred thousand livres *per annum* more than had been given before; and also to lend his majesty twelve hundred millions of livres to pay the debts of the state. These offers were accepted; and the king, in consideration hereof, granted them all the privileges of the several grants of the companies united to that company to the year 1770; on condition, however, of discharging all the debts of the old East India company, without any deduction at all. The loan of twelve hundred millions not being sufficient for the occasions of the state, was augmented, three months afterwards, with three hundred millions more; which, with the former loan, and another of one hundred millions before, made sixteen hundred millions, for which the king was to pay interest at the rate of three *per cent.*

The Duke of Orleans, in February 1720, did the company the honour to preside in their assembly, where he made several proposals to them on the part of the king: the principal of these was, that they should take on them the charge and administration of the royal bank. This was accepted of: and Mr Law, comptroller-general of the finances, was named by the king inspector-general of the India company and bank united.

This union, which, it was proposed, should have been a mutual help to both those famous establishments, proved the fatal point from whence the fall of both commenced: from this time, both the bank bills and the actions of the company began to fall. In effect, the first perished absolutely, and the other had been drawn along with it but for the prudent precautions taken for its support.

The first precaution was the revoking the office of inspector-general, and the obliging Mr Law to quit the kingdom: the ancient directors were discarded, and new ones substituted; and, to find the bottom of the company's affairs, it was ordered they should give an account of what they had received and disbursed, both on the account of the company and of the bank, which they had had the management of near a year. Another precaution to come at the state of the company was, by endeavouring to distinguish the lawful actionaries from the Mississippi extortioners; whose immense riches, as well as their criminal address in realizing their actions either into specie or merchandize, were become so fatal to the state; in order, if possible, to secure the honest adventurers in their stock. To this end, an inquisition was made into their books, &c. by persons appointed by the king; and the new directors, or, as they were called, *regisseurs*, began seriously to look about for their commerce abroad. Their affairs, however, declined, and at length sunk into a ruined and bankrupt state about the year 1769. The king immediately suspended their exclusive privileges, and laid the trade to the east open to all his subjects; consigning, at the same time, the affairs of the company to the care of the ministry to adjust and settle. But the various schemes which were then formed for the restoration of the old company, and the establishment of a new one, were accompanied with such unsurmountable difficulties, as to prove wholly ineffectual. Nor was the laying open of the trade attended immediately with the success that was expected; the merchants being very slow in engaging in it, though the king, by way of

Company. encouragement, lent them some of his own ships to convey their commodities to the East; and the garrison and civil establishments continued to be supported in their existing form by the crown. The measure, however, proved in time successful; so that for a course of years previous to 1785, the annual importation from India was considerably greater than during any former period. But whether it were that they regarded this prosperity as precarious; or that they aimed at a more extensive success; or that they wished, in imitation of Britain, for territorial acquisitions in that climate, and believed an incorporated society the best instrument of obtaining them; the French court was induced to listen to proposals for establishing a new East India company. Their privilege was for seven years, with the special proviso, that years of war which might occur in the interim should be excluded from the computation.

In the preamble of the act of the 14th April 1785, by which the scheme was adopted, it was alleged, "that the commodities of Europe not having of late years been regulated by any common standard, or proportioned to the demands of India, had on the one hand sold at a low price; while, on the other, the competition of the subjects of France had raised the price of the objects of importation: that, upon their return home, a want of system and assortment had been universally complained of, the market being glutted with one species of goods, and totally destitute of another: that these defects must necessarily continue as long as the trade remained in private hands; and that, on their account, as well as that of the capital required, the establishment of a new company was absolutely necessary."

These reasonings did not appear altogether satisfactory to the persons principally interested. France has been so far enlightened by the discussions of the excellent writers she has produced upon questions of politics and commerce, as not to be prepared to behold the introduction of monopolies with a very favourable eye. By many persons it was remarked, that the arguments of the preamble did not apply more to the trade of India than to any other trade; and that, if they were admitted in their entire force, they were calculated to give a finishing blow to the freedom of commerce. The capital of the new company, which amounted to L.830,000, was ridiculed as altogether inadequate to the magnitude of the undertaking. The privileges with which it was indulged were treated as enormous. The monopoly of East India goods imported into France from any part of Europe, was granted to them for two years, as well as the monopoly of East India goods imported from the place of their growth. It was said, that during that period they would fit out no adventures for India; that they hoped to obtain a prolongation of this injurious indulgence; and that, of consequence, their incorporation was in reality a conspiracy to prevent all future communication between France and the sources of commerce in Asia. A provision in the act, directing that the prices of East India goods in the islands of Mauritius and Bourbon should be regulated by a tariff to be fixed by the court of Versailles, excited still louder exclamations. In this instance, it was said, the first principles of commerce were trampled upon in a man-

ner the most wanton and absurd. Instead of suffering Company. it to find its own level by the mutual collision of the wants of one party and the labour of another, it was arbitrarily to be fashioned by a power whose extreme distance must necessarily render its decisions ill-timed and inapplicable. The very mode in which the monopoly was introduced was a subject of complaint. It was determined by a resolution of the king in council; a proceeding totally inadequate to the importance of the subject, and which was to be regarded as clandestine and surreptitious. In all former instances such measures assumed the form of edicts, and were registered in the parliaments. It was the prerogative of these courts to verify them; that is, to inquire into the facts which had led to their adoption. The injured parties had an opportunity of being heard before the privilege assumed the form of a law; not privately by the ministers of the sovereign, but publicly by the most considerable bodies in the kingdom, and in the face of the nation.

The act of council establishing a new East India company, was followed on the tenth of July by another declaration, intended still farther to promote their interest; by which it was expressly forbidden to import cottons, printed linens, and muslins, except thro' the medium of the company. The arret proceeds upon the same principles of monopoly as in the former instance. It sets out indeed with a declaration, "that nothing can appear more desirable to the king, or better accord with the sentiments of his heart, than a general liberty, that freeing at once the circulation of commodities from every species of restraint, should seem to make of all the people of the world but one nation with respect to commerce." But it adds, "that the period of this liberty is not yet arrived: that it must either be, with respect to the nations of Europe, unlimited and reciprocal, or that it cannot be admitted: that the revocation of the former indulgence respecting cottons and linens was become necessary on account of the opportunities it created for contraband trade; and because the competition of the East India company and private traders would occasion a surplus in the market, and the admission of foreign manufactures would decrease and annihilate the national industry."

The provisions that were made for carrying this law into effect were considered as unjust and severe. The merchants possessing any of the prohibited commodities were allowed twelve months to dispose of them; but upon the express condition, that the commodities were to bear a stamp, importing that they were vendible only to a certain period, a circumstance that must necessarily depreciate their value. It was also enacted, that the house of any trader might be entered by day or by night, at the solicitation of the directors, to search for prohibited goods, which were to be confiscated to the use of the company. These kinds of visits of the officers of revenue, hitherto unauthorised in France, were represented as peculiarly obnoxious, when they were made for the sole benefit of a privileged monopoly.

COMPANY, in military affairs, a small body of foot, commanded by a captain, who has under him a lieutenant and ensign.

The

Company.

The number of centinels or private soldiers in a company is from 50 to 100; and a battalion or regiment consists of 9, 10, or 11, such companies: one of which is always grenadiers; and posted on the right; next them stands the colonel's company, and on the left the light infantry company. Companies not incorporated into regiments are called *irregulars*, or *independent companies*.

Artillery COMPANY. See ARTILLERY.

COMPANY of Ships, a fleet of merchantmen, who make

a charter party among themselves; the principal conditions whereof usually are, that certain vessels shall be acknowledged admiral, vice-admiral, and rear-admiral; that such and such signals shall be observed; that those which bear no guns shall pay so much *per cent.* of their cargo; and in case they be attacked, that what damages are sustained shall be reimbursed by the company in general. In the Mediterranean, such companies are called *conserves*.

Company.

COMPARATIVE ANATOMY,

IS that branch of anatomy which considers the secondary objects, or the bodies of other animals; serving for the more accurate distinctions of several parts, and supplying the defect of human subjects.

It is otherwise called *the anatomy of beasts*, and sometimes *zootomy*; and stands in contradistinction to human anatomy, or that branch of the art which considers the human body the primary object of anatomy. See ANATOMY.

INTRODUCTION.

¹
The uses of
Comparative
Anatomy.

THE principal advantages of comparative anatomy are the following: First, it furnishes us with a sufficient knowledge of the different parts of animals, to prevent our being imposed upon by those authors who have delineated and described several parts from brutes as belonging to the human body. Secondly, it helps us to understand several passages in the ancient writers in medicine, who have taken many of their descriptions from brutes and reasoned from them. The third and great use we reap from this science, is the light it casts on several functions in the human economy, about which there have been so many disputes among anatomists.

²
How the
action of
muscles is
determined.

In this view it is altogether needless to insist on those parts whose use is usually understood when once their structure is unravelled: Thus, for instance, if we be acquainted with the action of the muscles in general, it will not be difficult to determine the use of any particular muscle whose origin and insertion is known, if we at the same time consider the various connections of the bones to which it is fixed, and the different degree of mobility they have with respect to each other. In the same manner, if we know the use of the nerves in general, we can easily assign the use of those nerves which are distributed to any particular part. There is then no occasion for a complete osteology, myology, &c. of the several animals we shall treat of, nor need we trouble ourselves about the structure of any of the parts, unless when it serves to illustrate some of the fore-mentioned purposes.

That the first use we proposed from examining the structure of the parts in brutes is real and of consequence, is evident from looking into the works of some of the earliest and greatest masters of anatomy, who for want of human subjects have often borrowed their descriptions from other animals. The great Vesalius, although he justly reproves Galen for this fault, is guilty of the same himself, as is plain from his delineations of the kidneys, uterus, the muscles of the eye,

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and some other parts. Nor is antiquity only to be charged with this, since in Willis's *Anatomia Cerebri* (the plates of which were revised by that accurate anatomist Dr Lower) there are several of the pictures taken from different brutes, especially the dog, besides those he owns to be such. We shall give several examples of the second use in the sequel of the work.

The animal kingdom, as well as the vegetable, contains the most surprising variety, and the descent in each is so gradual, that the little transitions and deviations are almost imperceptible. The bat and flying-squirrel, though quadrupeds, have wings to buoy themselves up in the air. Some birds inhabit the waters; and there are fishes that have wings, and are not strangers to the airy regions: the amphibious animals blend the terrestrial and aquatic together.

As there is then such a vast variety, it is not only needless, but impossible, to consider all of them particularly. We shall take only some of the most remarkable genera; and hope, from what will be said of them, any of the intermediate degrees may be understood.

In treating of quadrupeds, we shall divide them into the carnivorous, *i. e.* those that feed indifferently on animal and vegetable substances, and granivorous: as an instance of these last we shall take the ruminant kind. The fowls we shall also divide into those that feed on grain, and those that feed on flesh. The distinction we shall make in treating of fishes, shall be of those that have lungs, and those that have them not. The first indeed are with difficulty procured, and at the same time differ very little from quadrupeds. The structure of insects and worms is so very minute, that little assistance for the ends proposed by the present subject has been expected from their anatomical investigation. As they constitute, however, one of the great classes into which animals are divided, and as every advance in knowledge, with respect to the structure of any one animal, must either directly or indirectly cast some light on the structure of some part of every other, we have thought proper to add a few particulars concerning them.

In inquiring into the structure of different animals, we ought to be previously acquainted with the form of their body, manner of life, kind of food; or, in short, with their natural history; which will lead us to account for the reason of their different structure, and hence explain the actions of the human body. Of all those particulars a detail will be found under the titles of the different subjects in their alphabetical order.

I i

CHAP.

³
The variety
and uniformity
observable in
nature.

⁴
Division of
animals into
quadrupeds,
volatiles,
fishes,
and insects.

CHAP. I. *Anatomy of Quadrupeds.*SECT. I. *General Observations.*

5
Whether
man is na-
turally a
biped or a
quadruped.

A QUESTION has been started by some fanciful philosophers, "Whether man is naturally a *biped* or a *quadruped*?" and much ingenuity has been employed to establish the latter opinion. But it is presumed that few of their readers have been made converts to such an opinion, and that not many of ours will require much argument to persuade them of their erect destination. It may therefore suffice to observe, that this erect position is best adapted to the conformation of the human head, and the ponderous quantity of human brains:—that the articulation of the *os occipitis* with the first vertebrae of the neck, is differently constructed from that of quadrupeds, with the obvious design that man should be able to move his head in every direction with the greatest facility:—that the human species (and also monkeys) are destitute of that strong ligament or tendinous aponeurosis, vulgarly called *paxwax*, which quadrupeds possess (as a kind of *stay-tape*), to prevent the head from sinking to the earth; to which, from its natural position, it must be very prone:—and that our eyes and ears are, fortunately, not placed as those of the quadrupeds. The axis of the human eye is nearly perpendicular with a vertical section of the head; whereas, in the brute creation (the larger ape excepted), the position of the eyes forms an acute angle:—nature has also furnished other animals with a *suspensorium oculi*, a muscle which the erect attitude renders needless, though highly necessary in the *prone*; consequently, whoever tries the experiment will find that, in the inclined direction, both his eyes and his ears are in the most unfavourable situation possible for quick hearing or extensive vision. In fine, the shape, breadth, strength of the vertebrae of the back and loins, are all coincident with the erect attitude of the trunk.

ALL quadrupeds have a covering of hair, wool, &c. to defend them from the injuries of the weather, which varies in thickness according to the season of the year and difference of the climate: thus in Russia and the northern countries, the furs are very thick and warm, while the little Spanish lap-dogs, and Barbary cows, have little or no hair at all.

6
Cuticula,
cutis, pan-
niculus car-
nosus.

The cutis and cuticula in quadrupeds are disposed much in the same way as the human, only more elastic; immediately under this, there is a very thin cutaneous muscular substance called *panniculus carnosus*, which is common to all quadrupeds, the porcine kind excepted; this principally covers the trunk, serving to shrivel the skin, in order to drive off insects, their tails and heads not being sufficient for this purpose, while their extremities are employed in their support and progression.

7
Whence
the notion
of the pan-
niculus car-
nosus, &c.

It has probably been from observing some muscles of the human body, such as the *platysma myoides*, *cremaster*, and *frontales*, and the collapsed tunica cellulosa of emaciated subjects, to resemble this thin muscle, that some of the older anatomists reckoned such a *panniculus* among the common teguments of the human body. This Carolus Stephanus has well observed,

8
Why most
quadrupeds
want cla-
vicles.

Most part of quadrupeds want clavicles, whereby their anterior extremities fall upon their chest, so as

to make their thorax proportionally narrower than the human. This small distance of their anterior extremities is very necessary for their uniform progression: apes indeed and squirrels have clavicles to allow them a more full use of their extremities in climbing; but when they walk on all-fours, they move but indifferently.

Of Qua-
drupeds.

SECT. II. *Of the Orang Outang.*

WHILE some philosophers, as above noticed, have endeavoured to level man to the rank of quadrupeds, others have attempted to elevate certain of the brute creation to the same class with their reputed lords. The *orang outang* is ranged by Linnæus as congenerous with man (See *HOMO*); and some theorists have even considered him as the original stock of the human race, pretending that he has been the *man of the woods* for many ages before *gardens* were ever thought of. His claims to humanity are founded on his being able to walk upright occasionally, being furnished with a competent share of muscles requisite for the purpose. The form of his heart, lungs, breast, brains, intestines, are similar to those of men; the *cæcum* has also its *appendix vermiformis*: he can sit upright with great ease; shows more design in his plans than his associates in the forests; and can handle a stick on occasion with tolerable dexterity. His disqualifications are the following: The position of the *foramen magnum occipitis*, which is farther backward than in the human species, and the sockets of his lower jaw, made to receive the *dentes incisores* of the upper, indicate his relationship to the *monkey* breed. He has also *thirteen ribs* on each side; his arms, feet, and toes, are much longer than those of the human species, &c. and although his foot does not so closely resemble a hand as that of the ape, yet the *pollex pedis*, or the great toe, is placed at a greater distance from the other toes, which gives it the appearance and uses of a *thumb*. These differences indicate, that, although the *orang* can occasionally act the *biped*, yet he is much better qualified to walk on his fore-feet, and to climb trees, than the generality of the modern race of men. But an objection to his claims, still weightier than any of the differences stated above, arises from his want of *speech*. For there is no nation of men, however savage, that is destitute of speech; though individuals, secluded from society, may in time lose the faculty. No instances are known in which a company of ten or twelve men have been without a language; but upwards of thirty of the *orang* species have been found in a herd, without showing the smallest traces of this faculty. It has been suggested by Rousseau, that they may have lost the power from their neglect of using it; but it is very singular that they alone should lose this power, and not that race of men to whom they are supposed to be so nearly related. This point, however, has been completely decided by the discoveries of professor Camper; who in a paper in the *Philosophical Transactions** has demonstrated, by an anatomical dissection of the organ of the voice, that articulation is rendered impossible in these animals in consequence of the structure of that organ. From the nature and situation of those parts in the *orang* (as well as in the ape and in the monkey) he has proved, that no modulation of the voice resembling human speech can be produced in these creatures; because the air, passing through the

* Vol. lxxix.
Part i.
art. 14.

ring

Of Quad-
rureds.

rima glottidis, is immediately lost in two ventricles or hollow bags in the neck (which are sometimes united into one), with which all these animals are furnished, and which have a communication with the mouth through the said *rima* or slit; so that the air must return from thence, without any force or melody, within the throat and mouth of these creatures.

SECT. III. *The Anatomy of a Dog.*

WE may first observe of this animal, as indeed of most *quadrupeds*, that its legs are much shorter in proportion to its trunk than in man, the length of whose steps depends entirely on the length of his inferior extremities; however, to balance this, the trunk of the animal is proportionally longer and smaller, his spine more flexible, by which he is able at each step to bring his posterior extremities nearer to his anterior. His common teguments are much a-kin to those of other *quadrupeds*, only they allow little or no passage for sweat; but when he is over-heated, the superfluous matter finds an exit by the salivary glands, for he lolls out his tongue and flavers plentifully. We are not, however, to suppose, that because a dog does not sweat, he has no insensible perspiration. That a dog perspires is evident, because one of these animals can trace another by the scent of his footsteps; which could not happen if a large quantity of perspirable matter was not constantly going off.

9
Abdomen,
musculi py-
rum.

The pyramidal muscles are wanting, to supply which the rectus is inserted fleshy into the os pubis.

10
Omentum.

The omentum reaches down to the os pubis, which considering the posture of the animal we will find to be a wise provision, since its use is to separate an oily liquor for lubricating the guts and facilitating their peristaltic motion; so in our erect posture the natural gravity of the oil will determine it downward, but in the horizontal position of these creatures, if all the intestines were not covered, there would be no favourable derivation of the fluid to the guts lying in the posterior part of the abdomen, which is the highest; and besides, had the omentum reached much farther down in us, it would not only have supplied too great a quantity of oil to the lower part of the abdomen, but we would have been in continual danger of herniæ; and even at present the omentum frequently passes down with some of the other viscera, and forms part of these tumors. To these, however, the dog is not subject, as his viscera do not press so much on the rings of the abdominal muscles, and besides are prevented from passing through by a pendulous flap of fat, mentioned n° 35. The inferior and anterior lamella of the omentum is fixed to the spleen, fundus of the stomach, pylorus, liver, &c. in the same way as the human; but the superior having no colon to pass over, goes directly to the back-bone. This serves to explain the formation of the small omentum in the human body; which is nothing but the large omentum, having lost its fat, passing over the stomach and colon, where it reassumes its pinguedo, so proceeds, and is firmly attached to the liver, spine, &c. The strizæ of fat are pretty regularly disposed through it, accompanying the distribution of the blood-vessels to guard them from the pressure of the superincumbent viscera.

This animal's stomach, though pretty much resem-

bling the human in its shape, is somewhat differently situated. It lies more longitudinal, as indeed all the other viscera do, to accommodate themselves to the shape of the cavity in which they are contained; that is, its inferior orifice is much farther down with respect to the superior than the human: by this means the gross food has an easier passage into the duodenum. Again, the fundus of the human stomach, when distended, stands almost directly forwards, which is occasioned by the little omentum tying it so close down to the back-bone, &c. at its two orifices; but it not being fixed in that manner in the dog, the fundus remains always posterior: this also answers very well the shape of the different cavities, the distance betwixt the cardia and fundus being greater than that betwixt the two sides. It seems to be much larger in proportion to the bulk of the animal than the human, that it might contain a greater quantity of food at once; which was very necessary, since this animal cannot at any time get its sustenance as men do. The turbillion is not so large, nor is there any coarction forming the *antrum Willefii*, as in the stomach of man. It is considerably thicker and more muscular than ours, for breaking the cohesion of their food, which they swallow without sufficient chewing. Hence it is evident the force of the stomach is not so great as some would have it, nor its contraction so violent: otherwise that of dogs would be undoubtedly wounded by the sharp bones, &c. they always take down; for the contraction here is still greater than in the human stomach, which is much thinner. The rugæ of the tunica villosa are neither so large, nor situated transversely, as in the human, but go from one orifice to the other: the reason of which difference is, perhaps, that they might be in less danger of being hurt by the hard substances this creature frequently feeds upon; and for the same reason there is not the like coarction at their pylorus.

Of Qua-
drureds.

11

Ventricu-
lus.

The intestines of this animal are proportionally much shorter than ours; for the food which these creatures mostly use, soon dissolves, and then putrifies; on which account there was no occasion for a long tract of intestines, but on the contrary that it should be quickly thrown out of the body. The same is to be observed of all the carnivorous animals. The muscular coat of the intestines is also thicker and stronger than the human, to protrude the contents quickly and accurately.

12

Intestines.

The valvulæ conniventes are less numerous, and in a longitudinal direction; and the whole tract of the alimentary canal is covered with a slime, which lubricates the intestines, saves them from the acrimony of the excrementitious part, and facilitates its passage.

13

Duodenum;

The *duodenum* differs considerably in its situation from the human. For in man it first mounts from the pylorus upwards, backwards, and to the right side; then passes down by the gall bladder; and, marching over the right kidney and superior part of the psoas muscles, makes a curvature upwards; and passes over the back-bone and vena cava inferior, to the left hypochondrium, where it gets through the omentum, mesentery, and mesocolon, to commence the *jejunum*, being firmly tied down all the way, the biliary and pancreatic ducts entering at its most depending part: Whereas, in the dog, the duodenum is fixed at the pylorus to the

Of Quad-
rupeds.

14

Jejunum.

concave surface of the liver, and hangs loose and pendulous with the mesentery backwards into the cavity of the abdomen; then turning up again, is fixed to the back-bone, where it ends in the jejunum; the bile and pancreatic juice are poured into it at the most depending part. Therefore the same intention seems to have been had in view in the formation of this part in both, viz. the giving the chyle, after the liquors of the liver and pancreas are poured into it, a disadvantageous course, that so it might be the more intimately blended with the humours before its entry into the jejunum, where the lacteals are very numerous: And thus, by reason of their different posture, the same design (tho' by a very different order of the parts) is brought about in both.

15

Intestina
tenuia.

The other small guts are much the same with ours, only shorter. The great guts are also shorter and less capacious than in the human body; and we take it for a general rule, that all animals that live on vegetable food, have not only their small guts considerably longer, but also their great guts more capacious, than such creatures as feed on other animals. Hence man, from this form of his intestines, and that of the teeth, seems to have been originally designed for feeding on vegetables chiefly; and still the most of his food, and all his drink, is of that class.

The reason of this difference seems to be, that as animal food is not only much more easily reduced into chyle, but also more prone to putrefaction, too long a remora of the juices might occasion the worst consequences. So it was necessary that their receptacles should not be too capacious; but, on the contrary, being short and narrow, might conduce to the seasonable discharge of their contents. Whereas vegetable food being more difficultly dissolved and converted into an animal nature, there was a necessity for such creatures as fed on it to be provided with a long intestinal canal, that this food in its passage might be considerably retarded, and have time to change its indoles into one more agreeable to our nature. Besides which there is another advantage which accrues to man in particular, from having his great guts very capacious: for as he is a rational being, and mostly employed in the functions of social life, it would have been very inconvenient as well as unbecoming for him to be too frequently employed in such ignoble exercises; so that, having this large reservoir for his *fæces alvinæ*, he can retain them for a considerable time without any trouble.

16

Appendix
vermiformis.

The *appendix vermiformis* justly enough deserves the name of an *intestinum cæcum* in this subject, though in the human body it does not; and it has probably been from the largeness of this part in this and some other animals, that the oldest anatomists came to reckon that small appendicle in man as one of the great guts. On its internal surface we observe a great number of mucous glands. As all these throw out slime, their principal office would seem to be the procuring a sufficient quantity of that matter for the purposes above-mentioned. Still, however, there seems to be some unknown use for this organ in other animals; for the *appendicula vermiformis* in them is either of great size or of great length. In a rat, it is rather larger than the stomach; in others, as swine, and some of the ani-

mals which live on vegetables, it has long convolutions, so that the food must be lodged in it for a long time. Thus, probably, some change takes place in the food, which requires a considerable time to effectuate, and, though unknown to us, may answer very useful purposes to the animal.

The *colon* has no longitudinal ligaments; and consequently this gut is not purled up into different bags or cells as the human: nor does this intestine make any circular turn round the abdomen; but passes directly across it to the top of the os sacrum, where it gets the name of *rectum*.

At the extremity of the *intestinum rectum*, or verge of the anus, there are found two bags or pouches, which contain a most abominable fetid mucus of a yellow colour, for which we know no use, unless it serves to lubricate the strained extremity of the rectum, and defend it against the asperity of the *fæces*, or to separate some liquor that might otherwise prove hurtful to their bodies. There is nothing analogous to those sacs in the human subject, unless we reckon the mucilaginous glands that are found most frequent and largest about the lower part of the rectum.

The *mesentery* is considerably longer than in the human body; that, in his horizontal situation, the intestines may rest securely on the soft cushion of the abdominal muscles. The fat is here disposed in the same way, and for the same reason, as in the omentum. The interstices betwixt the fat are filled with a fine membrane. Instead of a great number of glandulæ vagæ to be found in the human mesentery, we find the glands few in number, and those are closely connected together; or there is only one large gland to be observed in the middle of the mesentery of a dog, which, from its imagined resemblance to the pancreas and the name of its discoverers, is called *pancreas Asellii*; but the resemblance, if there is any, depends chiefly on the connection, the structure being entirely different. The reason why this in man is as it were subdivided into many smaller ones, may possibly be, that as the guts of a human body are proportionally much longer than those of this creature, it would have been inconvenient to have gathered all the *lactea primi generis* into one place; whereas, by collecting a few of these vessels into a neighbouring gland, the same effect is procured much more easily. Whether the food in this animal needs less preparation in its passage through these glands, is a matter very much unknown to us; though it is certain that some changes really do take place.

The *pancreas* in man lies across the abdomen, tied down by the peritonæum; but the capacity of this creature's abdomen not allowing of that situation, it is disposed more longitudinally, being tied to the duodenum, which it accompanies for some way. Its duct enters the duodenum about an inch and a half below the ductus communis.

The *spleen* of this animal differs from ours very much, both in figure and situation. It is much more oblong and thin, and lies more according to the length of the abdomen, like the pancreas. Though the spleen of this creature is not firmly tied to the diaphragm (which was necessary in our erect posture to hinder it from falling downwards), yet by the animal's prone position,

Of Quad-
rupeds.

17

Colon.

18

Rectum.

19

Mesentery.

20

Pancreas
Asellii.

21

Pancreas.

22

Spleen.

Of Qua-
drupeds.23
Liver.

tion, its posterior parts being rather higher than the anterior, it comes to be always contiguous to this muscle, and is as effectually subjected to an alternate pressure from its action as the human spleen is.

The human *liver* has no fissures or divisions, unless you please to reckon that small one betwixt the two *pila*, where the large vessels enter: Whereas in a dog, and all other creatures that have a large flexion in their spine, as lions, leopards, cats, &c. the liver and lungs, are divided into a great many lobes by deep sections, reaching the large blood-vessels, which in great motions of the back-bone may easily shuffle over one another; and so are in much less danger of being torn or bruised, than if they were formed of one entire piece, as we really see it is in horses, cows, and such creatures as have their back-bone stiff and immoveable. There is here no *ligamentum latum* connecting the liver to the diaphragm, which in our situation was necessary to keep the viscus in its place: Whereas in this creature, it naturally gravitates forwards, and by the horizontal position of the animal is in no danger of pressing against the vena cava; the preventing of which is one use generally assigned to this ligament in man. Had the liver of the dog been thus connected to the diaphragm, the respiration must necessarily have suffered; for, as we shall see afterwards, this muscle is here moveable at the centre as well as at the sides: But in man the liver is fixed to the diaphragm, mostly at its tendinous part; that is, where the pericardium is fixed to it on the other side; so that it is in no danger of impeding the respiration, being suspended by the mediastinum and bones of the thorax. In consequence of this viscus being divided into so many lobes, it follows, that the hepatic ducts cannot possibly join into one common trunk till they are quite out of the substance of the liver; because a branch comes out from every lobe of the liver; all of which, by their union, form the hepatic duct: whence we are led to conclude, that the hepato-cystic ducts, mentioned by former authors, do not exist. The gall-bladder itself is wanting in several animals, such as the deer, the horse, the ass, &c.; but in place of it, in such animals, the hepatic duct, at its beginning, is widened into a reservoir of considerable size, which may answer the same purpose in them that the gall-bladder does in others.

24
Kidneys.

We come next, after having examined the chylipoietic viscera, to discourse of those organs that serve for the secretion and excretion of urine. And first of the kidneys: Which in this animal are situated much in the same way as in the human subject; but have no fat on their inferior surface, where they face the abdomen, and are of a more globular form than the human. The reason of these differences will easily appear, if you compare their situation and posture in this animal with those in a man who walks erect. They are placed in this subject in the inferior part of the body, so are not subject to the pressure of the viscera, which seems to be the principal cause of the fatness of those organs in us, and perhaps may likewise be the cause of our being more subject to the stone than other animals. Hence there is no need of any cellular substance to ward off this pressure where there would necessarily be fat collected; but the superior part of their kidneys is pretty well covered with fat, lest they

should suffer any compression from the action of the ribs and spine.

In the internal structure there is still a more considerable difference: For the *papilla* do not here send out single the several *tubuli uriniferi*; but being all united, they hang down in form of a loose pendulous flap in the middle of the pelvis, and form a kind of septum medium; so that a dog has a pelvis formed within the substance of the kidney. The only thing that is properly analogous to a pelvis in man is that sac or dilatation of the ureters formed at the union of the *ductus uriniferi*. The external part of the kidney of a dog somewhat resembles one of the lobes of the kidney of a human foetus: but in a human adult the appearance is very different; because, in man, from the continual pressure of the surrounding viscera, the lobes, which in the foetus are quite distinct and separated, concrete, but the original cortical substance is still preserved in the internal parts of the kidney. The reason of these particularities may probably be, that the liquors of this animal, as of all those of the carnivorous kind, being much more acrid than those that live on vegetable food, its urine must incline much to an alkalescency, as indeed the smell and taste of that liquor in dogs, cats, leopards, &c. evidently show, being fetid and pungent, and therefore not convenient to be long retained in the body. For this end it was proper that the secreting organs should have as little impediment as possible by pressure, &c. in the performing their functions; and for that design, the mechanism of their kidneys seems to be excellently adapted: We have most elegant pictures in Eustachius of the kidneys of brutes, delineated as such, with a view to show Vesalius's error in painting and describing them for the human.

The *glandula* or *capsula atrabiliaria* are thicker and rounder than the human, for the same reason as the kidneys.

The *ureters* are more muscular than the human, because of the unfavourable passage the urine has through them; they enter the bladder near its fundus.

The bladder of urine differs considerably from the human; and first in its form, which is pretty much pyramidal or pyriform. This shape of the dog's bladder is likewise common to all quadrupeds, except the ape and those of an erect posture. In man it is by no means pyriform, but has a large sac at its posterior and inferior part: this form depends entirely on the urine gravitating in our erect posture to its bottom, which it will endeavour to protrude; but as it cannot yield before, being contiguous to the os pubis, it will naturally stretch out where there is the least resistance, that is, at the posterior and lateral parts; and were it not for this sac, we could not so readily come at the bladder to extract the stone either by the lesser or lateral operation of lithotomy. Most anatomists have delineated this wrong: so much, that we know of none who has justly painted it, excepting Mr Cowper in his *Myotomia*, and Mr Butty. It has certainly been from observing it in brutes and young children, that they have been led into this mistake. The same cause, viz. the gravity of the urine, makes the bladder of a different form in brutes: In their horizontal position the cervix, from which the urethra is continued, is higher than its fundus; the urine must therefore dis-

Of Qua-
drupeds.25
Papillae.26
Pelvis.27
Capsulae atrabiliariae.28
Ureters.29
Vesica urinaria.

Of Qua-
drupeds.

dilend and dilate the most depending part by its weight.

30
Con-
ec-
tion.

As to its *connexion*, it is fastened to the abdominal muscles by a process of the peritoneum, and that membrane is extended quite over it; whereas in us its superior and posterior parts are only covered by it: hence in man alone the high operation of lithotomy can be performed without hazard of opening the cavity of the abdomen. Had the peritoneum been spread over the bladder in its whole extent, the weight of the viscera in our erect posture would have so bore upon it, that they would not have allowed any considerable quantity of urine to be collected there; but we must have been obliged to discharge its contents too frequently to be consistent with the functions of a social life: Whereas by means of the peritoneum, the urine is now collected in sufficient quantity, the viscera not gravitating this way.

31
Why the
human
bladder but
in part co-
vered by
the perito-
neum.

It may be taken for a general rule, that those creatures that feed upon animal-food have their bladder more muscular and considerably stronger, and less capacious, than those that live on vegetables, such as horses, cows, swine, &c. whose bladder of urine is perfectly membranous, and very large. This is wisely adapted to the nature of their food: For in these first, as all their juices are more acrid, so in a particular manner their urine becomes exalted; which, as its remora might be of very ill consequence, must necessarily be quickly expelled. This is chiefly effected by its stimulating this viscus more strongly to contract, and so to discharge its contents, though the irritation does

32
A stimulus
proved to
be a prin-
cipal cause
of the eva-
cuation of
the bladder.

not altogether depend upon the stretching, but likewise arises from the quality of the liquor. That a stimulus is one of the principal causes of the excretion of urine, we learn from the common saline diuretic medicines that are given, which are dissolved into the serum of the blood, and carried down by the kidneys to the bladder: The same appears likewise from the application of cantharides; or without any of these, when the parts are made more sensible, as in an excoriation of the bladder, there is a frequent desire to make water. Accordingly we find these animals evacuate their urine much more frequently than man, or any other creature that lives on vegetable food. And if these creatures, whose fluids have already a tendency to putrefaction, are exposed to heat or hunger, the liquids must for a considerable time undergo the actions of the containing vessels, and frequently perform the course of the circulation, without any new supplies of food; by which the fluids becoming more and more acrid, the creature is apt to fall into feverish and putrid diseases: And in fact, we find that fatal and melancholy distemper the *rabies canina*, *vulpina*, &c. frequent in these animals; whereas those that feed on vegetable food seldom or never contract those diseases but by infection.

33
Causes af-
signed for
the rabies
canina, &c.

That the causes commonly assigned for the rabies canina are insufficient to produce it in dogs and other animals of that kind, is denied in a dissertation on this disease by Dr Heysham. That heat is insufficient, he proves from the disease being totally unknown in South America, where the heat is much greater than in this country. Putrid aliment he also says is taken in great quantity by dogs without any inconvenience; and as it seems in this state to be most agreeable to them,

the rabies canina cannot with any probability be ascribed to it. As to want of water, he observes that the disease often originates among dogs that are plentifully supplied with that element, while others long deprived of it have remained perfectly free. In short, Dr Heysham totally denies, not only the efficacy of the causes commonly assigned for the rabies canina, but the nature of the distemper itself; and conjectures that the cause of it is not a *putrescency* but an *acidity* of the fluids.

Of Qua-
drupeds.

Their *spermatic vessels* are within the peritoneum, which is spread over them, and from which they have a membrane like a mesentery, so hang loose and pendulous in the abdomen: whereas, in us, they are contained in the cellular part of the peritoneum, which is tensely stretched over them. At their passage out of the lower belly, there appears a plain perforation, or holes; hence the adult quadruped, in this respect, resembles the human foetus. And from observing this in quadrupeds, has arisen the false notion of *hernia* or *rupture* among authors. This opening, which leads down to the testicle, is of no disadvantage to them, but evidently would have been to us; for from the weight of our viscera, and our continually gravitating upon these holes, we must have perpetually laboured under enterocoeles. This they are in no hazard of, since in them this passage is at the highest part of their belly, and, in their horizontal posture, the viscera cannot bear upon it: And, to prevent even the smallest hazard, there is a loose pendulous semilunar flap of fat; which serves two uses, as it both hinders the intestines from getting into the passage, and also the course of the fluids from being stopped in the vessels, which is secured in us by the cellular substance and tense peritoneum: And it may be worth while to observe, that this process remains almost unaltered, even after the animal has been almost exhausted of fat.

34
Vasa sper-
matica.

35
Whence
the false
notion of
hernia or
rupture.

There is next a passage quite down into the cavity where the testicles lie. Had the same structure obtained in man, by the constant drilling down of the liquor which is secreted for the lubricating of the guts, we should always have laboured under an hydrocele; but their posture secures them from any hazard of this kind: indeed your very fat lap-dogs, who consequently have an overgrown omentum, are sometimes troubled with an epiplocele.

The *scrotum* is shorter and not so pendulous as the human in all the dog kind that want the *vesiculae seminales*, that the seed at each copulation might the sooner be brought from the testes, thus in some measure supplying the place of the *vesiculae seminales*; for the course of the seed through the *vasa deferentia* is thus shortened, by placing the secreting vessels nearer the excretory organs. Perhaps its passage is likewise quickened by the muscular power of the *vasa deferentia*, which is stronger in this creature than in man. The want of *vesiculae seminales* at the same time explains the reason why this creature is so tedious in copulation. But why these bodies are absent in the dog kind more than in other animals, is a circumstance we know nothing of.

36
Scrotum.

37
The *vesi-
culae semi-
nales*, how
supplied.

The structure of the *testicles* is much the same with the human; as are likewise the *corpus pyramidale*, *varicosum*, or *pampiniforme*, and the *epididymis* or excretory vessel of the testicle. The *vasa deferentia* enter the

38
Testes.

Of Quadrapeds.

the abdomen where the blood-vessels come out; and, passing along the upper part of the bladder, are inserted a little below the bulbous part of the urethra.

39
Penis.

The præputium has two muscles fixed to it: one that arises from the sphincter ani, and is inserted all along the penis; and this is called *retractor præputii*: But the other, whose office is directly contrary to this, is cutaneous; and seems to take its origin from the muscles of the abdomen, or rather to be a production of their tunica carnosæ. The *corpora cavernosa* rise much in the same way as the human: but these soon terminate; and the rest is supplied by a triangular bone, in the inferior part of which there is a groove excavated for lodging the urethra. There are upon the penis two protuberant bulbous fleshy substances, resembling the glans penis in man, at the back of which are two veins, which by the *erectores penis* and other parts are compressed in the time of coition; and the circulation being stopped, the blood distends the large cavernous bodies. After the penis is thus swelled, the vagina by its contraction and swelling of its corpus cavernosum, which is considerably greater than in other animals, grips it closely; and so the male is kept in action some time contrary to his will, till time be given for bringing a quantity of seed sufficient to impregnate the female: and thus, by that *orgasmus veneris* of the female organs, the want of the *vesicula seminales* are in some measure supplied. But as it would be a very uneasy posture for the dog to support himself solely upon his hinder feet, and for the bitch to support the weight of the dog for so long a time; therefore, as soon as the bulbous bodies are sufficiently filled, he gets off and turns averse to her. Had, then, the penis been pliable as in other animals, the urethra must of necessity have been compressed by this twisting, and consequently the course of the seed intercepted; but this is wisely provided against by the urethra's being formed in the hollow of the bone. After the emission of the seed, the parts turn flaccid, the circulation is restored, and the bulbous parts can be easily extracted.

41
Prostata.

The *prostata* seems here divided into two, which are proportionably larger than the human, and afford a greater quantity of that liquid.

42
Uterus.

The *uterus* of multiparous animals is little else but a continuation of their vagina, only separated from it by a small ring or valve. From the *uterus* two long canals mount upon the loins, in which the fœtus are lodged: these are divided into different sacs, which are strongly constricted betwixt each fœtus; yet these constrictions give way in the time of birth. From these go out the *tubæ Fallopianæ*, so that the ovaria come to lodge pretty near the kidneys.

43
Diaphragm

We ought next to examine the structure of the thorax and its contents. But first it may not be amiss to remark of the *diaphragm* in its natural situation, that it is in general more loose and free than the human; which is owing to its connection with the neighbouring parts in a different manner from ours. The human *diaphragm* is connected to the pericardium; which again, by the intervention of the mediastinum, is tied to the sternum, spine, &c. but here there is some distance between the diaphragm and pericardium. We observe further, that its middle part is much more moveable, and the tendinous parts not so large. And indeed it was necessary their *diaphragm* should be some-

what loose, they making more use of it in difficult respiration than man. This we may observe by the strong heaving of the flanks of an horse or dog when out of breath; which corresponds to the rising of the ribs in us.

The disposition and situation of the *mammæ* vary as they bear one or more young. Those of the uniparous kind have them placed between the posterior extremities, which in them is the highest part of their bodies, whereby their young get at them without the inconvenience of kneeling: Nevertheless, when the creatures are of no great size, and their breast large, as in sheep, the young ones are obliged to take this posture. In multiparous animals, they must have a great number of nipples, that their several young ones may have room at the same time, and these disposed over both thorax and abdomen; and the creatures generally lie down when the young are to be suckled, that they may give them the most favourable situation. From this it does not appear to be from any particular fitness of the vessels at certain places for giving a proper nourishment to the child, that the breasts are so placed in women as we find them, but really from that situation being the most convenient both for mother and infant.

The *sternum* is very narrow, and consists of a great number of small bones, moveable every way; which always happens in creatures that have a great mobility in their spine. The ribs are straighter, and by no means so convex as the human; whereby in respiration the motion forward will very little enlarge their thorax, which is compensated by the greater mobility of their diaphragm: so our thorax is principally enlarged according to its breadth and depth, and theirs according to its length. The want of clavicles, and the consequent falling in of the anterior extremities upon the chest, may contribute somewhat to the straightness of the ribs.

The *mediastinum* in this creature is pretty broad. The pericardium is not here contiguous to the diaphragm, but there is an inch of distance betwixt them, in which place the small lobe of the lungs lodges; and by this means the liver, &c. of this animal, though continually pressing upon the diaphragm, yet cannot disturb the heart's motion.

The heart is situated with its point almost directly downwards, according to the creature's posture, and is but very little inclined to the left side. Its point is much sharper, and its shape more conoidal, than the human. Here the names of *right* and *left* ventricles are proper enough, though not so in the human; which ought rather to be called *anterior* and *posterior*, or *superior* and *inferior*. The animal has the *vena cava* of a considerable length within the thorax, having near the whole length of the heart to run over ere it gets at the *sinus Lowerianus dexter*. In men, as soon as it pierces the diaphragm, so soon it enters the pericardium, which is firmly attached to it, and immediately gets into the *sinus Lowerianus*; which sinus, in the human subject, by the oblique situation of the heart is almost contiguous to the diaphragm: and by this we discover, that several authors have taken their delineations of the human heart from brutes; which is easily detected by the shape and situation of the heart, and long *vena cava*, within the thorax. This was one of the faults of the curious wax-work that were shown at London and Paris, which were plainly taken from a cow.

Of Quadrapeds.

44

Thorax.

45

Mammæ.

46

Sternum.

47

Costæ.

48

Mediastinum.

49

Cor.

50

Vena cava.

This

Of Qua-
drupeds.

This situation of the heart of the creature agrees best with the shape of its thorax, which is lower than the abdomen.

51
Aorta ascendens,
improperly
so called.

The egress of the large blood-vessels from the heart is somewhat different from the human: For here the right subclavian comes off first: and as a large trunk runs some way upwards before it gives off the left carotid, and splits into the carotid and subclavian of the right side, then the left subclavian is sent off. So that neither here, properly speaking, is there an *aorta ascendens*, more than in the human; but this name has probably been imposed upon it from observing this in a cow, where indeed there is an ascending and descending aorta.

52
A mechanical account
of the superior
strength of
the right
arm, leg,
&c.

From this specialty of the distribution of the vessels of the right side, which happens, though not in so great a degree, in the human subject, we may perhaps in some measure account for the general greater strength, readiness, or facility of motion, which is observable in the right arm. Upon measuring the sides of the vessels, the surface of the united trunk of the right subclavian and carotid is less than that of the left subclavian and carotid, as they are separated. If so, the resistance to the blood must be less in that common trunk than in the left subclavian and carotid: But if the resistance be smaller, the absolute force with which the blood is sent from the heart being equal, there must necessarily be a greater quantity of blood sent through them in a given time; and as the strength of the muscles is *ceteris paribus*, as the quantity of blood sent into them in a given time, those of the right arm will be stronger than those of the left. Now children, being conscious of this superior strength, use the right upon all occasions; and thus from use comes that great difference which is so observable. That this is a sufficient cause, seems evident from fact; for what a difference is there betwixt the right and the left arm of one who has played much at tennis? View but the arms of a blacksmith and legs of a footman, and you will soon be convinced of this effect arising from using them. But if by any accident the right arm is kept from action for some time, the other from being used gets the better; and those people are left-handed: For it is not to be imagined, that the small odds in the original formation of the vessels should be sufficient to resist the effect of use and habit (instances of the contrary occur every day); it is enough for our present argument, that where no means are used to oppose it, the odds are sufficient to determine the choice in favour of the right. Now because it is natural to begin with the leg corresponding to the hand we have most power of, this is what gives also a superiority to the right leg.

This difference is not peculiar to man, but is still more observable in those creatures in whom the same mechanism does obtain in a greater degree. Do but observe a dog at a trot, how he bears forward with his right side; or look at him when a-scraping up any thing, and you will presently see that he uses his right much oftener than he does his left foot. Something analogous to this may be observed in horses. It has been the opinion of some anatomists, that left-handed people, as well as those distinguished by the name of *ambidexter* (who use both hands alike), have the two carotid and subclavian arteries coming off in

four distinct trunks from the arch of the aorta: but no appearance of this kind has ever been observed in such bodies as have been examined for this purpose; though indeed these have been but few; and more experience might throw greater light on the subject.

The *thymus* of this creature is proportionably much larger than ours; whereas the glandula thyroidea is much less, and is divided into two distinct parts, or there are two separate glands; which is not the case in man. The reason of this difference is unknown, as is likewise the use of the gland itself. It is generally remarked, that these two glands do thus always supply the place of each other; that is, in such animals as have a large thymus, the glandula thyroidea is smaller, and *vice versa*. Hence we are naturally led to ascribe the same use to both, viz. the separation of a thin lymph for diluting the chyle in the thoracic duct before it be poured into the blood; then if we consider the different formation of the thorax in both, we shall readily account for the variety in the bulk of these two glands. Respiration being chiefly performed in man by the widening of the chest, the lungs at every inspiration must press upon the thymus, and consequently diminish it: but the diaphragm yielding more in the dog's inspiration, this gland is not so much pressed by the lungs, and so will be larger; and hence the glandula thyroidea will be proportionably less. Again, from the posture of this creature, we shall see that it was much more convenient for a dog to have the most part of the diluting lymph supplied by the thymus, since the neck being frequently in a descending posture, the lymph of the thyroid gland would have a very disadvantageous course to get to the thoracic duct: whereas in the human body, the thymus is really below the lacteal canal, where it makes its curvature before it opens into the subclavian; and consequently there is a necessity of a considerable share of the diluting liquor being furnished by the thyroid gland, which is situated much higher; so that its lymph has the advantage of a perpendicular descent.

We may here observe, that the *thoracic duct* in a dog has no curvature before it enters the subclavian vein, the horizontal position of this animal allowing a favourable enough course to the chyle, so as not to need that turn to force its passage into the blood. It may likewise be observed, that such animals as walk horizontally have the valves of the thoracic duct fewer in number than others. The horse has only a single pair; while, on the contrary, the ape resembles man in having several valves. Thus the lymph is not only forwarded in its passage, but the weight of the column is diminished. The lungs of this creature are divided into more numerous lobes, and deeper, than they are in man, for the same reason as the liver. The left side of the thorax in this animal bears a greater proportion to the right than in man; the one being nearly as three to two, the other as four to three. In quadrupeds, as well as in man, the lungs are closely applied to the containing parts; although this has been denied by some.

We look on it as a general rule, that all quadrupeds, as having occasion to gather their food from the ground, are provided with longer necks than man: but as a long neck not only gives the advantage of too long a lever to the weight of the head, but also, when the animal is gathering his food, makes the brain in danger

Of Qua-
drupeds.

53
Thymus.
54
Glandula
thyroidea.

55
Ductus
thoracicus.

56
Neck.

Of Quadru-
peds.Of Quad ru
peds.57
Jaws.

of being oppressed with too great a quantity of blood, by the liquor in these arteries having the advantage of a descent, while that in the veins must remount a considerable way contrary to its own gravity; it was therefore necessary that a part of the length of the neck should be supplied by the length of the jaws. Thus we see horses, cows, &c. who have no occasion for opening their mouths very wide, yet have long jaws. Bulldogs, indeed, and such animals as have occasion for very strong jaws, must of necessity have them short; because the longer they are, the resistance to be overcome acts with a longer lever. Another exception to this general rule, is such animals as are furnished with something analogous to hands to convey their food to their mouths, as cats, apes, &c. The teeth of this creature plainly show it to be of the carnivorous kind; for there are none of them made for grinding its food, but only for tearing and dividing it. It has six remarkable sharp teeth before, and two very long tusks behind; both of which the ruminating animals want. These are evidently calculated for laying very firm hold of substances, and tearing them to pieces; and the vast strength of the muscles inserted into the lower jaw, assists greatly in this action; while the molares have sharp cutting edges, calculated for cutting flesh, and breaking the hardest bones. Even its posterior teeth are not formed with rough broad surfaces as ours are; but are made considerably sharper, and press over one another when the mouth is shut, that so they may take the firmer hold of whatever comes betwixt them.

59
Tongue.

The tongue, in consequence of the length of the jaws, is much longer than ours; and as this creature feeds with his head in a depending posture, the bolus would always be in danger of falling out of the mouth, were it not for several prominences or papillæ placed mostly at the root of the tongue, and crooked backwards in such a manner as to allow any thing to pass easily down to the jaws, but to hinder its return. By the papillæ also the surface of the tongue is increased, and a stronger impression is made on the sensation of taste. In some animals who feed on living creatures, these tenter-hooks are still more conspicuous; as in several large fishes, where they are almost as large as their teeth in the forepart of their mouth, and near as firm and strong.

60
Amygdals.

When we open the mouth, we see the amygdalæ very prominent in the posterior part of it; so that it would appear at first view, that these were inconveniently placed, as being continually exposed to injuries from the hard substances this creature swallows: but upon a more narrow scrutiny, we find this provided for by two membranous capsulæ, into which the amygdalæ, when pressed, can escape, and remove themselves from such injuries.

61
Velum pen-
dulum pa-
lati.

The *velum pendulum palati* is in this creature considerably longer than in man, to prevent the food from getting into his nose; which would happen more frequently in this animal than in man, because of its situation while feeding.

62
Glottis.63
Epiglottis.

In this subject, as well as in other quadrupeds, there is no *uvula*; but then the *epiglottis*, when pressed down, covers the whole rima entirely, and naturally continues so: there is therefore a ligament, or rather muscle, that comes from the *os hyoides* and root of the tongue, that is inserted into that part of the *epiglottis* where it

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is articulated with the cricoid cartilage, which serves to raise it from the rima, though not so strongly but that it may with a small force be clapped down again.

It may be asked, however, Why the *uvula* is wanting here, and not in man? This seems to be, that the quadrupeds, who swallow their food in an horizontal situation, have no occasion for an *uvula*, though it is necessary in man on account of his erect situation.

In the upper part of the pharynx, behind the cricoid cartilage, there is a pretty large gland to be found, which serves not only for the separation of a mucous liquor to lubricate the bolus as it passes this way, but also supplies the place of a valve, to hinder the food from regurgitating into the mouth, which it would be apt to do by reason of the descending situation of the creature's head. In man, the muscle of the *epiglottis* is wanting, its place being supplied by the elasticity of the cartilage.

The *œsophagus* is formed pretty much in the same way as the human. Authors indeed generally allege, that quadrupeds have their gullet composed of a double row of spiral fibres decussating one another; but this is peculiar to ruminating animals, who have occasion for such a decussation of fibres. The action of these you may easily observe in a cow chewing her cud.

The *nose* is generally longer than in man, and its external passage much narrower. The internal structure is also better adapted for an acute smelling, having a larger convoluted surface on which the *membrana scheideriana* is spread; and this is to be observed in most quadrupeds, who have the *ossa spongiosa* commonly large, and these too divided into a great number of excessively fine thin lamellæ. The sensibility seems to be increased in proportion to the surface; and this will also be found to take place in all the other senses. The elephant, which has a head pretty large in proportion to its body, has the greatest part of it taken up with the cavity of the nose and frontal sinuses; which last extend almost over their whole head, and leave but a small cavity for their brains. A very nice sense of smelling was not so absolutely necessary for man, who has judgment and experience to direct him in the choice of his food; whereas brutes, who have only their senses, must of necessity have these acute, some having one sense in greater perfection than others, according to their different way of life. We not only conclude *a priori* from the large expanded *membrana scheideriana*, that their sense of smelling is very acute, but we find it so by cows and horses distinguishing so readily betwixt noxious and wholesome herbs, which they do principally by this sense.

The external ear in different quadrupeds is differently framed, but always calculated to the creature's manner of life. In shape it commonly resembles the oblique section of a cone from near the apex to the basis. Hares, and such other animals as are daily exposed to insults from beasts of prey, have large ears directed backwards, their eyes warning them of any danger before; rapacious animals, on the other hand, have their ears placed directly forwards, as we see in the lion, cat, &c. The slow hounds, and other animals that are designed to hear most distinctly the sounds coming from below, have their ears hanging downwards; or their ears are flexible, because they move

K k

their

67
Auris.

Of Quadru-
peds.

their head for the most part with greater difficulty than man. Man, again, who must equally hear sounds coming from all quarters, but especially such as are sent from about his own height, has his external ear placed in a vertical manner, somewhat turned forward. In short, wherever we see a specialty in the make of this organ in any creature, we shall, with very little reflection, discover this form to be more convenient for that creature than another. The animal also has the power of directing the cone of the ear to the sonorous body without moving the head. There are some differences to be observed in the structure of the internal ear in different animals; but we know so very little of the use of the particular parts of that organ in the human subject, that it is altogether impossible to assign reasons for these variations in other creatures.

68
Membrana
nictitans.

All quadrupeds have at the internal canthus of the eye a strong firm membrane with a cartilaginous edge, which may be made to cover some part of their eye; and this is greater or less in different animals as their eyes are more or less exposed to dangers in searching after their food. This *membrana nictitans*, as it is called, is not very large in this animal. Cows and horses have it so large as to cover one half of the eye like a curtain, and at the same time is transparent enough to allow abundance of the rays of light to pass through it. Fishes have a cuticle always over their eyes, as they are ever in danger in that inconsistent element. In this then we may also observe a sort of gradation.

69
Musculus
suspensorius.

All quadrupeds have a seventh muscle belonging to the eye, called *suspensorius*. It surrounds almost the whole optic nerve, and is fixed into the sclerotic coat as the others are. Its use is to sustain the weight of the globe of the eye, and prevent the optic nerve from being too much stretched, without obliging the four straight muscles to be in a continual contraction, which would be inconvenient; at the same time this muscle may be brought to assist any of the other four, by causing one particular portion of it to act at a time.

70
Pupilla.

The next thing to be remarked is the figure of the *pupil*, which is different in different animals, but always exactly accommodated to the creature's way of life, as well as to the different species of objects that are viewed. Man has it circular, for obvious reasons: an ox has it oval, with the longest diameter placed transversely, to take in a larger view of his food: cats, again, have theirs likewise oval, but the longest diameter placed perpendicularly; they can either exclude a bright light altogether, or admit only as much as is necessary. The pupil of different animals varies in wideness, according as the internal organs of vision are more or less acute: Thus cats and owls, who seek their prey in the night, or in dark places (and consequently must have their eyes so formed as that a few rays of light may make a lively impression on the retina), have their pupils in the day-time contracted into a very narrow space, as a great number of rays would oppress their nice organs; while in the night, or where the light is faint, they open the pupil, and very fully admit the rays. In the same way, when the retina is inflamed, a great number of rays of light would occasion a painful sensation; therefore the pupil is contracted: on the contrary, in dying people, or in

a beginning amaurosis, it is generally dilated, as the eyes on such occasions are very difficultly affected, and as it were insensible.

The posterior part of the choroid coat, which is called *tapetum*, is of different colours in different creatures. Fox oxen, feeding mostly on grass, have this membrane of a green colour, that it may reflect upon the retina all the rays of light which come from objects of that colour, while other rays are absorbed: Thus the animal sees its food better than it does other objects. Cats and owls have their tapetum of a whitish colour; and for the same reasons have the pupil very dilatable, and their organs of vision acute: And we shall find, that all animals see more or less distinctly in the dark, according as their tapetum approaches nearer to a white or black colour. Thus dogs, who have it of a greyish colour, distinguish objects better in the night than man, whose tapetum is dark brown; and who, it is believed, sees worse in the dark of any creature: it being originally designed that he should rest from all kinds of employment in the night-time. The difference then of the colour of the tapetum, as indeed the fabric of any other part in different creatures, always depends on some particular advantage accruing to the animal in its peculiar manner of life from this singularity.

72
Cerebrum.

We shall now proceed to the brain, which we remark in the first place is proportionally much smaller in all quadrupeds than the human; but, as in man, it is divided into cerebrum and cerebellum, and these two parts bear nearly the same proportion to one another as in us. There was no such occasion for so great a quantity of brain in those animals as in man; seeing in them all its energy is employed in their progression, while man has a great waste of spirits in the exercise of his reason and intellectual faculties. And besides all this, a great bulky brain would be inconvenient to these creatures, in so far as it would add considerably to the weight of the head; which having the advantage of a long lever to act with, would require a much greater force to support it than now it does; for the heads of the greatest part of quadrupeds are not near so heavy as they would at first seem to be, from the *sinus frontales* being produced a great way upwards to enlarge the organs of smelling.

The pits in the anterior part of their skulls are much more conspicuous than in the human cranium; which may be occasioned by the depending posture of these creatures heads while they gather their food: the brain at this time gravitating much on the bones while they are as yet soft, will gradually make impressions upon them at these places where it rises into eminences. This is prevented in man mostly by his erect posture.

The *falk* is not near so large in quadrupeds as in man, as they have little occasion to lie on either side, and the two hemispheres of the brain are in a great measure hindered from jostling against one another in violent motions, by the brain's insinuating itself into the above mentioned pits.

The second process of the *dura mater*, or *tentorium cerebelli super-expansum*, is considerably thicker and stronger in most quadrupeds than in man; especially in such of them as are very swift of foot, as hares and rabbits, and that most when they are old. This membrane

73
Falk.

Of Qua-
drupeds.Of Qua-
drupeds.74
Processus
mamillares.

brane is generally ossified, or we find the place of it supplied by a bone, that it may the more effectually keep off the superincumbent brain from the cerebellum in their rapid motions, which otherwise would be of bad consequence.

The olfactory nerves are very large, and justly deserve the name of *processus mamillares*. They are hollow, and consist of a medullary and cineritious substance, and at first sight appear to be the anterior ventricles of the brain produced; but in man they are small, and without any discernible cavity. The reason of this is pretty evident, if we consider how this animal's head is situated; for the lymph continually gravitating upon the inferior part of the ventricles, may thus elongate and produce them; but from this very inferior part the olfactory nerves rise, and are sent immediately through the *os ethmoides* into the nose. Hence the ancients, thinking they were continued hollow into the nose, believed they were the emunctories of the brain: in the brain of sheep, which by its firm texture is the best subject of any for searching into the structure of this part, we evidently see, that the name of the *sigmoid cavity* was very properly applied by the ancients to the lateral ventricles of the brain; which are really of a greater extent than they are ordinarily painted by the anatomists, reaching farther backwards, and forwards again under the substance of the brain. The cortical and medullary parts, as well as the corpus callosum, are similar to those parts in man.

75
Nates
Testes.

The *nates* and *testes* deserve this name much better here than in the human body, with respect to each other. They are larger in the quadruped; and hence we perceive that there is no great reason for ascribing the different operations to any particular size or shape of these parts. They are here also of different colours; the *nates* being of the colour of the cortical, and the *testes* of the medullary substance of the brain; whereas in man they are both of one colour. The reason of these differences, and others of the like nature to be met with, we shall not pretend to determine; for we have hitherto such an imperfect knowledge of the brain itself, that we are entirely ignorant of the various uses of its different parts. We may in general conclude, that the varying in one animal from what it is in another, is fitted to the creature's particular way of living.

76
Rete mira-
bile Galeni.

The *rete mirabile Galeni*, situated on each side of the *fella turcica*, about which there has been so much dispute, is very remarkable in most quadrupeds. This plexus of vessels is nothing else than a continuation of the internal carotid arteries, which, entering the skull, divide into a vast number of minute branches running along the side of the *fella turcica*; and, uniting afterwards, are spent on the brain in the common way. Galen seems with justice to suppose, that this plexus of vessels serves for checking the impetuosity of the blood destined for the brain.

The structure of the brain differing but very little in all quadrupeds, it will be needless to examine it in any other.

77

SECT. IV. *The Anatomy of a Cow.*

THE next species of quadrupeds we proposed to consider was the ruminant kind, of which we have an

example in a cow; and accordingly shall take the *foetus* of the animal *in utero*, that we may first remark some things that are peculiar to it in that state, and afterwards proceed to examine its viscera as a ruminant animal. First, then, as a *foetus*.—However, before we begin our inquiry, it may be worth our observation, that from the ovarium something essentially necessary for the production of the *foetus* is derived, as well as in the human species.

The form of a cow's *uterus* differs from the human in having two pretty large cornua. This is common to it with other brutes; for a bitch has two long *cornua uteri*; But these again differ (as being multiparous and uniparous) in this, that in the bitches cornua the *foetus* are contained; whereas here there is only part of the *secundines*, being mostly the allantois with the included liquor. The muscular fibres of the uterus are more easily discovered; its internal surface has a great number of spongy, oblong, protuberant, glandular bodies fixed to it. These are composed of vessels of the uterus terminating here. In an impregnated uterus, we can easily press out of them a chylous mucilaginous liquor; they are composed of a great many processes or digituli, and deep caverns, answering to as many caverns and processes of the placenta. Their resemblance has occasioned the name of *papilla* to be given them; and hence it was that Hippocrates was induced to believe that the *foetus* sucked *in utero*. The *papillae* are found in all the different stages of life, in the various stages of pregnancy, and likewise in the unimpregnated state. It is not easy to determine whether the uterus grows thicker or thinner in the time of gestation. The membranes, it is plain (by the stretching of the parts), must be made thinner; but then it is as evident, that the vessels are at that time enlarged, upon which principally the thickness of any part depends; so there seems to be as much gained the one way as lost the other.

The *os uteri* is entirely shut up by a glutinous mucilaginous substance, that is common to the females of all creatures when with young: by this the external air is excluded, which would soon make the liquors corrupt: it also prevents the inflammation of the membranes, and the hazard of abortion. By this means also the lips of the womb are kept from growing together, which otherwise they would certainly at this time do. There are mucous glands placed here to secrete this gluten, which on the breaking of the membranes with the contained waters make a sapo that lubricates and washes the parts, and makes them easily yield. The first of the proper involucra of the *foetus* is the chorion.

The *chorion* is a pretty strong firm membrane, on whose external surface are dispersed a great many red fleshy bodies of the same number, size, and structure, with the *papillae*, with which they are mutually indented. They have been called *cotyledones*, from *Κοτυλη*, *Cotyle*, "cavity." This is greatly disputed by some as a name very improper; but we think without reason, since the surface that is connected to the *papillae* is concave, though when separated it appears rather convex. To shun all dispute, they may be called properly enough *placentulae*, since they serve the same use as the placenta in women. The separation of these from the *papillae* without any laceration, and our not being able

Of Qua-
drupeds.

to inject coloured liquors from the vessels of the glands of the uterus into the placentulæ, seem to prove beyond a reply, that there can be here no anastomoses betwixt the vessels; on their coats run a great number of vessels that are sent to the several placentulæ, on the external side next to the uterus; whereas in creatures that have but one placenta, as in the human subject, cats, dogs, &c. the adhesion is somewhat firmer: The placentæ are likewise joined to the papillæ in the cornua uteri. We shall next give the history of the *allantois*.

83
Allantois.

This is a fine transparent membrane contiguous to the former. It is not a general involucre of the fœtus in the mother, for it covers only a small part of the amnios. It is mostly lodged in the cornua uteri. In mares, bitches, and cats, it surrounds the amnios, being every where interposed betwixt it and the chorion. In sheep and goats it is the same as in this animal; and in swine and rabbits it covers still less of the amnios. This sac is probably formed by the dilatation of the urachus, which is connected at its other end to the fundus of the bladder, through which it receives its contents; and a great quantity of urine is commonly found in it. The membrane is doubled at the extremity of the canal, to hinder the return of the urine back into the bladder. Its vessels are so excessively fine and few, that we cannot force an injected liquor farther than the beginning of this coat. This membrane is so far analogous to the cuticula, as not to be liable to corruption, or easily irritated by acrid liquors.

84
The arguments for
and against
the human
allantois.

The existence of this membrane in women has been very warmly disputed on both sides. Those who are against its existence deny they could ever find it; and, allowing it were so, allege, that since the urachus is impervious, as appears by our not being able to throw liquors from the bladder into it, or *vice versa*, it cannot serve the use that is agreed by all it does serve in beasts; and therefore in the human body there is no such thing. But if we consider, on the other hand, first, that there seems to be the same necessity for such a reservoir in man as in other animals: secondly, that we actually find urine contained in the bladder of the human fœtus: thirdly, that urine has been evacuated at the navel when the urethra was stopped, which urine without this conduit would have fallen into the cavity of the abdomen: fourthly, that midwives have pretended to remark two different sorts of waters come away at the time of birth: and, lastly, that Dr Littre and Dr Hale have given in this membrane of an human subject, with all the other secundines curiously prepared, the one to the royal academy at Paris, the other to the royal society at London; by which societies their respective accounts are attested; not to mention Verheyen, Heister, Keill, &c. who affirm their having seen it; and Mr Albinus, that famous anatomist, professor at Leyden, is said to have shown to his college every year a preparation of it: On all these accounts it seems most probable, that there is such a membrane in the human body.

85
Amnios.

The third proper integument of the fœtus is the *amnios*. It is thinner and firmer than the chorion; it has numerous ramifications of the umbilical vessels spread upon it, the lateral branches of which separate a liquor into its cavity. This is the proper liquor of the am-

nios: which at first is in a small quantity, afterwards increases for some months, then again decreases; and in a cow near her time, the quantity of this liquor is not above a pound. This membrane does not enter the *cornua uteri* in this creature, being confined to the body of the uterus; whereas the allantois occupies chiefly its cornua. But for what further relates to the structure of the involucre, with the nature of the liquors contained in them, we must refer to the second volume of Medical Essays, from page 121, where you have the sum of all we know of this matter.

There are here two *vena umbilicales*, and but one in the human subject; because the extreme branches coming from the several placentulæ could not unite so soon as they would have done had they come all from one cake as in the human.

There is a small round fleshy body that swims in the urine of this creature, mares, &c. which is the *hippomane* of the ancients. Several idle opinions and whims have been entertained as to its use; but that seems to be still unknown, or how it is generated or nourished, for it has no connection with the fœtus or placentulæ.

Having thus considered the several involucre of this animal in a fœtus state, let us next observe the specialities in its internal structure peculiar to a fœtus.

The umbilical vein joins the *vena portarum* in the *capsula Glissoniana*, without sending off any branches as it does in the human subject. This vein soon after birth turns to a ligament; yet there are some instances where it has remained pervious for several years after birth, and occasioned a hæmorrhage. We may next observe the duct called *canalis venosus*, going straight from the *capsula Glissoniana* to the *vena cava*; this turns also afterwards to a ligament. The umbilical arteries rise at acute angles from the internal iliacs, whatever some may say to the contrary; these also become impervious.

The pulmonary artery coming from the right ventricle of the heart divides into two; the largest, called *canalis arteriosus*, opens into the descending aorta; the other divides into two, to serve the lungs on each side.

The *foramen ovale* is placed in the partition betwixt the right and left auricles. At the edge of the hole is fixed a membrane, which when much stretched will cover it all over; but more easily yields to a force that acts from the right auricle to the left, than from the left to the right.

After what has been said, we may easily understand how the circulation is performed in a fœtus. The blood, being brought from the placenta of the mother, is thrown into the *capsula Glissoniana*, where it is intimately blended with the blood in the *vena portarum*: then part of this blood goes directly into the *vena cava* by the *ductus venosus*; the rest passes through the liver. First, then, the whole is sent from the *vena cava* into the right auricle, from whence part of it is sent by the *foramen ovale* into the left auricle; the rest passes into the right ventricle, then into the pulmonary artery; then the greatest share it receives is sent immediately into the descending aorta by the *canalis arteriosus*, and the remainder circulates through the lungs, and is sent back by the pulmonary veins into the left auricle; which, with the blood brought there by the *foramen ovale*, is sent into the left ventricle, from whence it is driven by the aorta through the

Of Qua-
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86

Vena umbi-
lialis.

87

Canalis ve-
nosus.

88

Foramen
ovale.

89

The circu-
lation, how
performed
in a fœtus.

Of Quad-
rureds.

Of Quad-
rureds.

90
Messieurs
Mery and
Winflow,
their opi-
nions of it
examined.

the body. The great design of this mechanism is, that the whole mass of blood might not pass through the collapsed lungs of the foetus; but that part of it might pass through the *foramen ovale* and *canalis arteriosus*, without circulating at all through the lungs.

This was the opinion that universally prevailed till the end of the last century, when it was violently opposed by Monsieur Mery, who is very singular in several of his opinions. He will not allow that the *foramen ovale* transmits blood from the right to the left auricle, but on the contrary from the left to the right; and that for no other reason but because he observed the pulmonary artery in a foetus larger than the aorta. Mr Winslow endeavours to reconcile these two opinions, by saying the blood may pass either way, and that it is here as it were blended: his reason is, that on putting the heart in water, the *foramen ovale* transmits it any way. Mr Rohault, professor of anatomy at Turin, and formerly one of Mery's scholars, strongly defends his master, and criticises Mr Winslow. What he principally builds on, is the appearance this *foramen* has in some dried preparations: This Mr Winslow will not allow as a proof. After all, the common opinion seems most probable; and that for the following reasons: First, the pulmonary artery being larger signifies nothing, since its coats are not only thinner and will be more easily distended, but also the resistance to the blood in the pulmonary artery from the collapsed lungs is greater than the resistance to the blood in the aorta. Secondly, if we should allow any of these two uncommon opinions, we should have the right ventricle vastly more capacious than the left: For if we suppose the *foramen ovale* to be capable of transmitting one-third of the whole mass of blood in any given time, and the *canalis arteriosus* as much in the same time, then you will find, that, according to Mr Mery's opinion, the whole mass of blood being driven from the right ventricle into the pulmonary artery, one-third passes by the *canalis arteriosus* into the descending aorta, two-thirds passing through the lungs and returning into the left auricle; one-half of which portion, or one-third of the whole mass, passes by the *foramen ovale* into the right auricle; and the other, or the last third, will be sent into the left ventricle, and thence expelled into the aorta; which third, with that from the pulmonary artery by the *canalis arteriosus*, circulating through the body, are returned into the right auricle, where meeting with the other third from the *foramen ovale*, with it they are sent into the right ventricle to undergo the same course. Thus the whole mass is expelled by the right ventricle, and only one-third by the left. If this was the case, why is not the right ventricle three times as large and strong as the left?

Then if, according to Mr Winslow's system, the *foramen ovale* transmit equal quantities from both auricles, this comes to the same as if there was no *foramen ovale* at all: that is to say, the whole mass going from the right auricle into the right ventricle and pulmonary artery, one-third of the whole mass passes into the aorta through the *canalis arteriosus*; the other two-thirds, passing through the lungs, return to the left auricle and ventricle. Thus the right ventricle expels the whole mass; the left, only two-thirds.

But if, according to the common opinion, we suppose the *foramen ovale* to convey the blood from the right to

the left auricle, then one-third passes this way into the left ventricle; the other two-thirds are sent by the right ventricle into the pulmonary artery: from whence one third passes by the *canalis arteriosus* into the aorta descending; the other third circulates through the lungs, and is returned into the left ventricle; where meeting with that from the *foramen ovale*, it is therewith expelled into the aorta, and with the one-third transmitted by the *canalis arteriosus* returns into the right auricle to run the same race as before. Thus we conclude, that two-thirds are expelled by each ventricle, and the whole circulates through the body; and hence they come to be of pretty equal dimensions. In all this calculation no regard has been had to the blood discharged from the umbilical vessels; but the greater quantity returned by the veins, than sent out by the arteries, still argues for the common opinion.

The kidneys in the foetus are composed of different lobes, which serve to give us an idea of the kidneys being a congeries of different glands; these lobes being kept contiguous by the external membrane, are pressed by the other viscera, till at length they unite.

We come now to consider the creature as a ruminant animal. There are no *dentes incisores* in the upper jaw but the gums are pretty hard, and the tongue rough. This roughness is occasioned by long sharp pointed papillæ, with which the whole substance of it is covered. These papillæ are turned towards the throat; so that by their means the food, having once got into the mouth, is not easily pulled back. The animals therefore supply the defect of teeth by wrapping their tongue round a tuft of grass; and so, pressing it against the upper jaw, keep it stretched, and cut it with the teeth of the under jaw; then, without chewing, throw it down into the oesophagus, which in these creatures consists of a double row of spiral fibres decussating one another. All animals which ruminate must have more ventricles than one; some have two, some three; our present subject has no less than four. The food is carried directly down into the first, which lies upon the left side, and is the largest of all; it is called *γαστήρ*, *ventriculus*, and *κοιλία*, by way of eminence. It is what is called by the general name of *paunch* by the vulgar. There are no rugæ upon its internal surface; but instead of these there are a vast number of small blunt-pointed processes, by which the whole has a general roughness, and the surface is extended to several times the size of the paunch itself. The food, by the force of its muscular coat, and the liquors poured in here, is sufficiently macerated; after which it is forced up hence by the oesophagus into the mouth, and there it is made very small by mastication; this is what is properly called *chewing the cud*, or *rumination*; for which purpose the *dentes molares* are exceedingly well fitted: for instead of being covered with a thin crust, the enamel on them consists of perpendicular plates, between which the bone is bare, and constantly wearing faster than the enamel, so that the tooth remains good to extreme old age; and by means of these teeth the rumination is carried on for a long time without any danger of spoiling them. After rumination, the food is sent down by the gullet into the second stomach; for the oesophagus opens indifferently into both. It ends exactly where the two stomachs meet; and there is a smooth gutter with ri-

91
The kid-
neys.

92
The history
of it as a
ruminant
animal.

93
It has four
stomachs.

94
Their
names and
description.

fin-

Of Qua-
drupeds.

sing edges which leads into the second stomach, from thence to the third, and also to the fourth: however, the creature has a power to direct it into which it will. Some tell us, that the drink goes into the second; but that might be easily determined by making them drink before slaughter. The second stomach, which is the anterior and smaller, is called *κεκρυφαλος*, *reticulum*, *honeycomb*, the *bonnet*, or *king's hood*. It consists of a great number of cells on its internal surface, of a regular pentagonal figure, like to a honeycomb. Here the food is farther macerated; from which it is protruded into the third, called *εχινος* or *omasum*, *vulgo* the *manyplies*, because the internal surface rises up into a great many plicæ or folds, and *stratum super stratum*, according to the length of this stomach. Some of these plicæ are farther produced into the stomach than others; *i.e.* first two long ones on each side, and within these two shorter in the middle, &c. There are numberless glandular grains like millet-seeds dispersed on its plicæ, from which some authors call this stomach the *millet*. From this it passes into the fourth, whose names are *ανυστρον*, *abomassum*, *caillè*, or the *red*, which is the name it commonly has because of its colour. This much resembles the human stomach, or that of a dog; only the inner folds or plicæ are longer and looser: and it may also be observed, that in all animals there is only one digestive stomach, and that has the same coagulating power in the fœtus as the fourth stomach in this animal; whence this might not improperly be called the only true stomach. *Caillè* signifies *curdled*; and hence the French have given that as a name to this fourth stomach, because any milk that is taken down by young calves is there curdled. It is this fourth stomach, with the milk curdled in it, that is commonly taken for making runnet: but after the bile and pancreatic juice enter, this coagulation is not to be found, which shows the use of these liquors. There are other creatures which use the same food, that have not such a mechanism in their digestive organs. Horses, asses, &c. have but one stomach, where grass is macerated, and a liquor for their nourishment extracted, and the remainder sent out by the anus very little altered. From this different structure of the stomach in these creatures, a ruminant animal will be served with one-third less food than another of equal bulk: grassiers are sufficiently acquainted with this. The reason is, that ruminating animals have many and strong digestive organs; all their food is fully prepared, and almost wholly converted into chyle: But a horse's stomach is not fitted for this; so that he requires a much greater quantity of food to extract the same nourishment.

95
Intestina.

The guts of these creatures are of a considerable length in proportion to the bulk of the body; and this confirms what we said formerly on the subject of the intestines of a dog, *viz.* that the length and capacity of the guts were different in different animals, according to the nature of their food.

96
Duode-
num.

The *duodenum* is formed here much the same way as in a dog, and the general intention kept in view with regard to the mixture of the bile and pancreatic lymph. The great guts here hardly deserve that name, their diameter differing very little from that of the small ones; but to compensate this, they are much longer pro-

portionally than a dog's are, being convoluted as the small guts are. The *cæcum* is very large and long. The digestion of the cow, as well as some other animals, is accompanied with a peculiar kind of action called *rumination*; the intention of which seems to be, that the food may be sufficiently comminuted, and thus more fully acted upon by the stomach: for it is not observed that a calf ruminates as long as it is fed only upon milk, though the action takes place as soon as it begins to eat solid food. But it is to be observed, that as long as a calf feeds only upon milk, the food descends immediately into the fourth stomach (which, as has been already mentioned, seems only capable of performing the operation of digestion) without stopping in any of the first three. The rumination does not take place till after the animal has eaten a pretty large quantity: after which she lies down, if she can do it conveniently, and begins to chew; though the operation will take place in a standing posture, if she cannot lie down. In this action a ball is observed to rise from the stomach with great velocity, almost as if shot from a musket. This ball the animal chews very accurately, and then swallows it again, and so on alternately, till all the food she has eaten has undergone this operation. This is easily explained from the structure of the *œsophagus*, which has one set of fibres calculated for bringing up the grass, and another for taking it down.

By means of rumination, the cow extracts a much larger proportion of nourishment from her food than those animals which do not ruminate; and hence she is contented with much worse fare, and smaller quantities of it, than a horse; hence also the dung of cows, being much more exhausted of its fine parts than horse-dung, proves much inferior to it as a manure.

The *spleen* differs not much either in figure or situation from that of a dog's; but it is a little more firmly fixed to the diaphragm, there not being here so much danger of this viscus's being hurt in the flexions of the spine.

97
Spleen.

The *liver* is not split into so many lobes in this creature as either in a man or dog; which depends on the small motion this creature enjoys in its spine, which made such a division needless. This also confirms what we formerly advanced on this head.

98
Liver.

Their *vesica urinaria* is of a pyramidal shape. It is very large, and more membranaceous: for the urine of these creatures not being so acrid as that of carnivorous animals, there was no such occasion for expelling it so soon.

99
Bladder.

The male is provided with a loose pendulous *scrotum*, and consequently with *vesiculæ seminales*. The female organs differ from those of a bitch, mostly as to the form of the cornua uteri, which are here contorted in form of a snail. In this, and all uniparous animals, they contain only part of the secundines; but in bitches, and other multiparous animals, they run straight up in the abdomen, and contain the fœtus themselves.

100
Scrotum.
Vesiculæ
seminales.

The situation of the *heart* is pretty much the same with that of a dog, only its point is rather sharper: In us, the heart beating continually against the ribs, and both ventricles going equally far down to the con-

101
Cor.

stitution

Of Fowls. ¹⁰²stitution of the apex, it is very obtuse: but here the apex is made up only of the left ventricle, so is more acute.

Aorta ascendens and descendens. ¹⁰²The aorta in this creature is justly divided into ascending and descending, though this division is ill founded either in a dog or man; and it has certainly been from this subject that the older anatomists took their descriptions when they made this division; for here the aorta divides into two, the ascending and descending.

CHAP. II. Of Fowls.

THE next class of animals we come to consider are of the feathered kind; which are divided into the granivorous and carnivorous. But before we go on to consider the specialties in the viscera of each kind, we must observe what both species agree in.

SECT. I. Of Fowls in general.

¹⁰³Their covering. FOWLS have a particular covering of feathers different from all other creatures, but exactly well suited to their manner of life: for it not only protects them from the injuries of the weather, but serves them in their progression through that thin aerial element they are for the most part employed in; and as some fowls live much in the water, their feathers being continually besmeared with an oily liquor, keeps the water from soaking into their skins, and so prevents the bad effects which it would infallibly otherwise produce.

¹⁰⁴Their wings, how furnished. Fowls have the strongest muscles of their whole body inserted into their wings; whence by the way we may observe, that it is altogether impossible for man to buoy himself up into the air like birds, even though he had proper machines in place of wings, unless he were likewise provided with muscles strong enough for moving them, which he has not. In the next place, their wings are not placed in the middle of their bodies, but a good deal further forwards; whence it would at first view appear, that their heads would be erect, and their posterior parts most depending when raised in the air; but by stretching out their heads which act upon the lever of a long neck, they alter their centre of gravity pretty much; and also by filling the sacs or bladders in the inside of their abdomen with air, and expanding their tail, they come to make the posterior part of their bodies considerably higher; and thus they fly with their bodies nearly in an horizontal situation. Hence we find, that if their necks are kept from being stretched out, or if you cut away their tails, they become incapable of flying any considerable way.

¹⁰⁵Why not placed in the middle of the body. The largeness of the wings in different fowls varies according to the occasions of the creature. Thus birds of prey, who must fly a considerable way to provide their food, have large strong wings; whereas domestic birds, who find their nourishment almost every where, have very short and but small wings. Their tail is of use in assisting to raise them in the air; though the chief purpose of it is to serve as a rudder in guiding their flight, whilst they use their wings as we do oars in putting forward a boat. The best account of this manner of progression of fowls is given by Alfonso Borrellus, in his treatise *De Motu Animalium*; and in the *Religious Philosopher* we have Borrelli's doctrine stripped pretty much of its mathematical form. The posterior

extremities are situated so far back, as to make us at first think they would be in continual hazard of falling down forwards when they walk: but this is prevented by their holding up their heads and neck, so as to make the centre of gravity fall upon the feet; and when they have occasion for climbing up a steep place, they stretch out their heads and necks forward, especially if they are short-legged, the better to preserve properly the balance of the body. Thus we may observe a goose entering a barn-door, where generally there is an ascending step, to stretch out its neck, which before was raised, and incline its body forwards. This is laughed at by the common people, who ascribe it to a piece of folly in the goose, as if afraid of knocking its head against the top of the door.

¹⁰⁶Carnivorous animals are provided with strong crooked claws for the catching their prey: water-fowls use them for swimming; and, principally for this purpose, have a strong firm membrane interposed betwixt the toes. There is a beautiful mechanism to be observed in the toes of fowls, which is of considerable use to them. For their toes are naturally drawn together, or bended, when the foot is bended: this is owing to the shortness of the tendons of the toes, which pass over them, which is analogous to our heel; and that the toes are set in the circumference of a circle, as our fingers are: Hence, when the foot is bended, the tendons must consequently be much stretched; and, since they are inserted into the toes, must of necessity bend them when the foot is bended; and when the foot is extended, the flexors of the toes are again relaxed, and they therefore expanded. This is also of great use to different kinds of fowls: thus the hawk descending with his legs and feet extended, spreads his talons over his prey; and the weight of his body bending his feet, the toes are contracted, and the prey is seized by the talons. This is also of great use to water-fowls: for had there been no such contrivance as this, they must have lost as much time when they pulled their legs in as they had gained by the former stroke: but, as the parts are now framed, whenever the creature draws in its foot, the toes are at the same time bended and contracted into less space, so that the resistance made against the water is not near so great as before: on the contrary, when they stretch their foot, their toes are extended, the membrane betwixt them expanded, and consequently a greater resistance made to the water. Again, such fowls as live mostly in the air, or have occasion to sustain themselves on branches of trees in windy weather, and even in the night-time when asleep, while all their muscles are supposed to be in a state of relaxation; such have no more to do but lean down the weight of their bodies, and their toes continue bended without any muscles being in action; and whenever they would disentangle themselves, they raise up their bodies, by which their feet, and consequently their toes, are extended.

¹⁰⁷The rostrum, bill, or beak of fowls, is composed of two mandibulae; and, as in quadrupeds, the upper one has no motion but what it possesses in common with the head. But parrots are an exception to this rule; for they can move the upper mandible at pleasure: this is exceeding convenient, as it enables them to lay hold of whatever comes in their way. Carnivorous fowls

Of Fowls.

A peculiar mechanism in the toes of fowls.

The variety in the beaks of fowls. Its uses, &c.

Of Fowls. fowls have their beaks long, sharp, and crooked; the domestic fowls, such as the hen-kind, &c. have strong short beaks, commodiously fitted to dig up and break their food; the water-fowls, again, have long or very broad scoop-like beaks, which is most convenient for them. The sternum of fowls is much larger proportionally than the human, and has a ridge rising in its middle for the more commodious origin of the muscles that move the wings. It is also less moveable than ours; for had it been very moveable, a great deal of the force employed for moving the wings would at every contraction of the muscles have been lost, or else some other muscles must have come in play to keep firm the sternum; but this additional weight would have been inconvenient for their progression.

What other things are most remarkable in the structure of the several viscera, we shall consider in that common domestic animal the cock or hen, and afterwards observe the difference of their viscera chylopoietica from a carnivorous fowl.

SECT. II. *Anatomy of the Domestic Cock.*

THOUGH this kind of birds live upon food somewhat similar to that of man, yet as they have no teeth to separate or break down this food, we would expect to find something to compensate for the want of teeth, something remarkable in the organs of digestion: we shall therefore begin with these parts.

108
Œsophagus.
Ingluvies.

The *œsophagus* of this creature runs down its neck, somewhat inclined to the right side; and terminates in a pretty large membranous sac, which is the *ingluvies* or crop, where the food is macerated and dissolved by a liquor separated by the glands, which are easily observed every where on the internal surface of this bag. The effect of this maceration may be very well observed in pigeons, who are sometimes in danger of being suffocated by the pease, &c. they feed upon, swelling to such an immense bulk in their *ingluvies*, that they can neither get upwards nor downwards. If it be a favourite fowl, it might be preserved by opening the sac, taking out the pease, and sewing up the wound.

109
Ventriculus
succenturiatus seu infundibulum.

The food getting out of this sac goes down by the remaining part of the *œsophagus* into the *ventriculus succenturiatus*, or *infundibulum Peyerii*, which is a continuation of the gullet with more numerous glands, which separate a liquor to dilute the food still more, which at length gets into the true stomach or gizzard, *ventriculus callosus*, which consists of two very strong muscles covered externally with a tendinous aponeurosis, and lined on the inside by a very thick firm membrane, which we evidently discover to be a production of the cuticula. This might have been proved in some measure *à priori*, from taking notice, that this membrane, which in chicks is only a thin slight pellicle, by degrees turns thicker and stronger the more attrition it suffers: but there is no other animal substance, so far as we know, which grows more hard and thick by being subjected to attrition, excepting the cuticula.—

110
Epidermis invests the internal surface of all the cavities and vessels of the human body.

Hence may be drawn some kind of proof of what has been affirmed concerning the tunica vellosa of the stomach and intestines in the human body, viz. that it was in part a continuation of the epidermis; nay, all the hollow parts of the body, even arteries, veins, &c. seem to be lined with a production of this membrane, or one analogous to it. The use of the internal coat

Of Fowls. of the stomach of fowls is to defend the more tender parts of that viscus from the hard grains and little stones those creatures take down. The use of the gizzard is to compensate for the want of teeth; and it is well fitted for this purpose from the great strength it possesses.

The digestion of these animals is performed merely by attrition, as is evinced by many experiments; and it is further assisted by the hard bodies they swallow. We see them daily take down considerable numbers of the most solid rugged little flints they find; and these can serve for no other purpose than to help the trituration of their aliments. After these pebbles, by becoming smooth, are unfit for this office, they are thrown up by the mouth. Hence fowls that are long confined, though ever so well fed, turn lean for want of these stones to help their digestion. This was put beyond all dispute by Mr Sauvry, who gave a species of metal to an ostrich, convex on one side and concave on the other, but carved on both; and opening the creature's body some time after, it was found, that the carving on the convex side was all obliterated, while the engraved character remained the same as before on the concave side, which was not subjected to the stomach's pressure: which could not have happened had digestion been performed by a menstruum, or any other way whatsoever; but may be easily solved by allowing a simple mechanical pressure to take place. We are, however, by no means to conclude from this, as some have too rashly done, that in the human body digestion is performed by simple attrition; otherwise we may, with equal strength of reason, by as good arguments drawn from what is observed in fishes, prove that the aliments are dissolved in our stomachs by the action of a menstruum. But this method of reasoning is very faulty; nor can it ever bring us to the true solution of any philosophical or medical problem. It is very plain, since the structure of the parts of the human stomach are so very different from that of this creature, that it is foolish and unreasonable to imagine both of them capable of producing the same effects. At each end of the stomach, there are as it were two particular sacs of a different texture from the rest of the stomach, not consisting of strong muscular fibres; they seem to be receptacles for the stones (especially at the end which is farthest from the orifice), while the digested aliment is protruded into the intestines.

Spallanzani, however, has lately found, that pebbles are not at all necessary to the trituration of the food of these animals. At the same time, he does not deny, that when put in motion by the gastric muscles, they are capable of producing some effect on the contents of the stomach; but is inclined to believe, that they are not sought for and selected by design, as many suppose, but because they frequently happen to be mixed with the food.

The *duodenum* begins pretty near the same place at which the *œsophagus* enters; yet notwithstanding the vicinity of these two tubes, the aliments are in no danger of getting out before they are perfectly digested, by reason of a protuberance, or *septum medium*, betwixt the orifices; and in those creatures who have such a strong muscular stomach, it is a matter of great indifference whether the entry of the *œsophagus* or pylorus be

Of Fowls. be highest, provided that the entry from the oesophagus does not allow the food to regurgitate, since the force of the stomach can easily protrude it towards the duodenum. This gut is mostly in the right side, and hangs pendulous in their abdomen, having its two extremities fixed to the liver. The *ductus choledochus* enters near its termination, where it mounts up again to be fixed to the liver; and left, by the contraction of the intestines, the bile should pass over without being intimately blended with the chyle, that duct enters downwards, contrary to the course of the food, and contrary to what is observed in any of the animals we have yet mentioned. But still the general intention is kept in view, in allowing these juices the fairest chance of being intimately blended with the food.

112
Ductus
choledo-
chus.

113
Intestina
tenuia.

The *small guts* are proportionally longer than those of carnivorous birds, for the general cause already assigned. At the end of the ileum they have two large *intestina ceca*, one on each side, four or five inches long, coming off from the side of the rectum, and ascending; and we find them containing part of the food: These serve as reservoirs to the feces; which, after some remora, there regurgitate into what soon becomes the rectum; which, together with the excretories of urine and organs of generation, empties itself into the common cloaca. The small intestines are connected by a long loose mesentery, which has little or no fat accompanying the blood-vessels, three being no hazard of the blood's being stopped.

116
Pancreas.

The *pancreas* in the creature lies betwixt the two folds of the duodenum, and sends two or three ducts into this gut pretty near the biliary.

117
The spleen.

The *spleen* is here of a round globular figure, situated between the liver and stomach; and betwixt these and the back-bone it enjoys the same properties as in other animals, viz. large blood-vessels, &c. All its blood is sent into the *vena portarum*, and has a perpetual confluxation. It has not excretory, as far as we know. Their *liver* is divided into two equal lobes by a pellucid membrane, running according to the length of their body: and hence we may observe, that it is not proper to that bowel to lie on the right side; which is still more confirmed by what we observe in fishes, where the greatest part of it lies in the left side.

118
Liver.

119
Vesica fel-
lis.

The shape of their *gall-bladder* is not much different from that of quadrupeds; but is thought to be longer in proportion to the size of the animal, and is farther removed from the liver.

120
Cor.

The principal difference to be remarked in their *heart*, is the want of the *valvula tricuspidis*, and their place being supplied by one fleshy flap.

121
Pulmones,
their struc-
ture and
uses.

The *lungs* are not loose within the cavity of the thorax, but fixed to the bone all the way; neither are they divided into lobes, as in those animals that have a large motion in their spine. They are two red spongy bodies, covered with a membrane that is pervious, and which communicates with the large vesicles or air-bags that are dispersed over their whole abdomen; which vesicles, according to Dr Monro, serve two very considerable uses. The one is to render their bodies specifically light, when they have a mind to ascend and buoy themselves up when flying, by distending their lungs with air, and also straiten their *trachea arteria*, and so return the air. Secondly, they supply the place of a muscular *diaphragm* and strong abdominal muscles;

122
The use of
the vesicles
in the ab-
domen.

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producing the same effects on the several contained viscera, as these muscles would have done, without the inconvenience of their additional weight; and conducting as much to the exclusion of the egg and feces.

Dr Hunter hath lately made some curious discoveries relative to these internal receptacles of air in the bodies of birds. Some of them are lodged in the fleshy parts, and some in the hollow bones; but all of them communicate with the lungs. He informs us, that the air-cells which are found in the soft parts have no communication with the cellular membrane which is common to birds as well as other animals. Some of them communicate immediately with each other; but all of them by the intervention of the lungs as a common centre. Some of them are placed in cavities, as the abdomen; others in the interstices of parts, as about the breast. The bones which receive air are of two kinds; some of them divided into innumerable cells; others hollowed out into one large canal. They may be distinguished from such as do not receive air, by having less specific gravity; by being less vascular; by containing little oil; by having no marrow nor blood in their cells; by having less hardness and firmness than others; and by the passage for the air being perceivable.

The mechanism by which the lungs are fitted for conveying air to these cavities is, their being attached to the diaphragm, and connected also to the ribs and sides of the vertebræ. The diaphragm is perforated in several places by pretty large holes, allowing a free passage of air into the abdomen. To each of these holes is attached a distinct membranous bag, thin and transparent. The lungs open at their anterior part into membranous cells, which lie upon the sides of the pericardium, and communicate with the cells of the sternum. The superior parts of the lungs open into cells of a loose net-work, through which the trachea and oesophagus pass. When these cells are distended with air, it indicates passion, as in the case of the turkey-cock, pouting-pigeon, &c.

These cells communicate with others in the axilla, and under the large pectoral muscle; and those with the cavity of the os humeri, by means of small openings in the hollow surface near the head of that bone. Lastly, The posterior edges of the lungs have openings into the cells of the vertebræ, ribs, os sacrum, and other bones of the pelvis, from which the air finds a passage to the cavity of the thigh-bone.

Concerning the use of these cavities the doctor conjectures, that they are a kind of appendage to the lungs; and that, like the bags continued through the bellies of amphibious animals, they serve as a kind of reservoirs of air. They assist birds during their flight, which must be apt to render frequent respiration difficult. He farther insinuates that this construction of the organs of respiration may assist birds in singing; which, he thinks, may be inferred from the long continuance of song between the breathings of a canary-bird. On tying the trachea of a cock, the animal breathed through a canula introduced into his belly; another through the os humeri, when cut across; and a hawk through the os femoris. In all these cases the animals soon died. In the first, the doctor ascribes the death to an inflammation of the bowels; but in the last, he owns it was owing to difficult breathing.

L 1

What

Of Fowls.
123
The dia-
phragm,
how sup-
plied.

¹²⁴ **Of Fowls.** What took place, however, was sufficient to show that the animals really did breathe through the bone.

When we examine the upper end of the *trachea*, we observe a *rima glottidis* with muscular sides, which may act in preventing the food or drink from passing into the lungs: for there is no *epiglottis* as in man and quadrupeds.

¹²⁴
Trachea arteria.

The *trachea arteria*, near where it divides, is very much contracted; and their voice is principally owing to this contraction. If you listen attentively to a cock crowing, you will be sensible that the noise does not proceed from the throat, but deeper; nay, this very pipe, when taken out of the body, and cut off a little after its division, and blown into, will make a squeaking noise, something like the voice of these creatures. On each side, a little higher than this contraction, there is a muscle arising from their sternum, which dilates the trachea. The cartilages, of which the pipe is composed in this animal, go quite round it; whereas in man and quadrupeds they are discontinued for about one-fourth on the back-part, and the intermediate space is filled up by a membrane. Neither is the trachea so firmly attached to their vertebræ as in the other creatures we have examined. This structure we shall find of great service to them, if we consider, that had the same structure obtained in them as in us, their breath would have been in hazard of being stopped at every flexion or twisting of their neck, which they are frequently obliged to. This we may be sensible of by bending our necks considerably on one side, upon which we shall find a great straitness and difficulty of breathing; whereas their trachea is better fitted for following the flexions of the neck by its loose connection to the vertebræ.

In place of a *muscular diaphragm*, this creature has nothing but a thin membrane connected to the pericardium, which separates the thorax and abdomen. But besides this, the whole abdomen and thorax are divided by a longitudinal membrane or *mediastinum* connected to the lungs, pericardium, liver, stomach, and to the fat lying over their stomach and guts, which is analogous to an *omentum*, and supplies its place.

¹²⁵
Lymphatic system.

The *lymphatic system* in birds consists, as in man, of lacteal and lymphatic vessels, with the thoracic duct.

The lacteals indeed, in the strictest sense, are the lymphatics of the intestines; and, like the other lymphatics, carry only a transparent lymph; and instead of one thoracic duct, there are two, which go to the jugular veins. In these circumstances, it would seem that birds differ from the human subject, so far at least as we may judge from the dissection of a *goose*, the common subject of this inquiry, and from which the following description is taken.

The lacteals run from the intestines upon the mesenteric vessels: those of the duodenum pass by the side of the pancreas; afterward they get upon the celiac artery, of which the superior mesenteric is a branch. Here they are joined by the lymphatics of the liver, and then they form a plexus which surrounds the celiac artery. Here also they receive a lymphatic from the gizzard, and soon after another from the lower part of the oesophagus. At the root of the celiac artery they are joined by the lymphatics from the *glandulæ renales*, and near the same part by the lac-

teals from the other small intestines, which vessels accompany the lower mesenteric artery; but, before they join those from the duodenum, receive from the rectum a lymphatic, which runs from the blood-vessels of that gut. Into this lymphatic some small vessels from the kidneys seem to enter at the root of the celiac artery. The lymphatics of the lower extremities probably join those from the intestines. At the root of the celiac artery and contiguous part of the aorta, a net-work is formed by the vessels above described. From this net-work arise two thoracic ducts, of which one lies on each side of the spine, and runs obliquely over the lungs to the jugular vein, into the inside of which it terminates, nearly opposite to the angle formed by the vein and this subclavian one. The thoracic duct of the left side is joined by a large lymphatic, which runs upon the oesophagus. The thoracic ducts are joined by the lymphatics of the neck, and probably by those of the wings where they open into the jugular veins. The lymphatics of the neck generally consist of two large branches, on each side of the neck, accompanying the blood-vessels; and these two branches join near the lower part of the neck, and form a trunk which runs close to the jugular vein, and opens into a lymphatic gland; from the opposite side of this gland a lymphatic comes out, which ends in the jugular vein.

On the left side, the whole of this lymphatic joins the thoracic duct of the same side: but, on the right one, part of it goes into the inside of the jugular vein a little above the angle; whilst another joins the thoracic duct, and with that duct forms a common trunk, which opens into the inside of the jugular vein, a little below the angle which that vein makes with the subclavian. This system in birds differs most from that of quadrupeds, in the chyle being transparent and colourless, and in there being no visible lymphatic glands, neither in the course of the lacteals, nor in that of the lymphatics of the abdomen, nor near the thoracic ducts.

¹²⁶
Kidneys. The *kidneys* lie in the hollow excavated in the side of the back-bone, from which there is sent out a bluish-coloured canal running along by the side of the *vas deferens*, and terminating directly in the common cloaca. This is the *ureter*, which opens by a peculiar aperture of its own, and not at the penis. Fowls having no *vesica urinaria*, it was thought by some they never passed any urine, but that it went to the nourishment of the feathers: but this is false; for that whitish substance that you see their greenish faeces covered with, and which turns afterwards chalky, is their urine. Let us next consider the organs of generation of both sexes, and first those of the male.

¹²⁷
The organs of generation in the male. The *testicles* are situated one on each side of the back-bone; and are proportionally very large to the creature's bulk. From these run out the *vasa seminfera*; at first straight; but after they recede farther from the body of the testicle, they acquire an undulated or convoluted form, as the epididymis in man. These convolutions partly supply the want of *vesiculae seminales*, their coition being at the same time very short: These terminate in the penis, of which the cock has two, one on each side of the common cloaca, pointing directly outwards. They open at a distance from each other, and are very small and short; whence they have escaped the notice of anatomists, who have often denied their existence. In birds there is no prostate.

Of Fowls. ¹²⁸state gland. This is what is chiefly remarkable in the organs of the male.

¹²⁸
Vitellari-
um.

The *racemus vitellorum*, being analogous to the ovaria in the human subject, are attached by a proper membrane to the back-bone. This is very fine and thin, and continued down to the uterus. Its orifice is averse with respect to the ovaria; yet notwithstanding, by the force of the *orgasmus venereus*, it turns round and grasps the *vitellus*, which in its passage through this duct, called the *infundibulum*, receives a thick gelatinous liquor, secreted by certain glands. This, with what it receives in the uterus, composes the white of the egg. By this tube then it is carried into the uterus. The shell is lined with a membrane; and in the large end there is a bag full of air, from which there is no outlet.

¹²⁹
Uterus.

The *uterus* is a large bag, placed at the end of the *infundibulum*, full of wrinkles on its inside; here the egg is completed, receiving its last involucre, and is at last pushed out at an opening on the side of the common cloaca. From the testes in the male being so very large in proportion to the body of the creature, there must necessarily be a great quantity of semen secreted; hence the animal is salacious, and becomes capable of impregnating many females. The want of the *vesiculae seminales* is in some measure supplied by the convolutions of the *vasa deferentia*, and by the small distance betwixt the secreting and excretory organs. The two *penes* contribute also very much to their short coition; at which time the opening of the uterus into the cloaca is very much dilated, that the effect of the semen on the vitelli may be the greater.

¹³⁰
The want
of the *vesi-*
culæ semi-
nales, how
supplied.

A hen will of herself indeed lay eggs; but these are not impregnated, and yet appear entirely complete, except that the small black spot, which comes afterwards to be the rudiments of the chick, is not here to be observed.

After having observed the contents of the abdomen and thorax, we next proceed to examine the parts about the neck and head.

These creatures, as was observed of fowls in general, have no teeth. Some, indeed, have an appearance of teeth; but these are only small processes or *ferræ* rising out from the mandible, without any socket, &c. which would have been needless, as they swallow their food entire. But their *tongue* is made pretty firm, lest it should be hurt by the sharp points of the grain they feed on. It is of a triangular figure, and pointed before; and as by their depending posture their meat is in hazard of falling out of their mouths, to prevent this there are several small pointed papillæ standing out upon their tongue and palate, with their points inclined backwards, allowing an easy passage to the food, but hindering it to return.

¹³¹
Tongue, its
form.

We have here no *velum palatinum*, *uvula*, or *epiglottis*; and in place of two large holes opening into the nose, there is only a long narrow rima supplied with pretty strong muscles, and such another supplies the place of a glottis. The creature has a power of shutting both at pleasure; and the nature of their food seems not only to exempt them from the hazard of its getting into the nose or trachea, but its sharp points would hurt an *uvula*, or *epiglottis*, if they had any.

Hence we see with what difficulty they swallow dough or other sort of food that can be easily moulded into any form. When we examine the upper end of the trachea, we observe a rima glottidis with muscular sides, which may act in preventing the food or drink from passing into their lungs, for there is no *epiglottis* as in man and quadrupeds.

Of Fowls.

Their *cranium* is more cellular and cavernous than ours. By this means their heads are light, yet strong enough to resist external injuries; for the enlarging the diameter of bones contributes to their strength. By this cavernous cranium the organ of smelling is supposed to be considerably enlarged; and further, singing birds, as is observed by Mr Ray and Mr Derham, have this cavernous structure of the brain still more observable: and we are told that the cavity of the tympanum communicates with the cells: but this seems rather founded on theory than matter of fact. Their brain is covered with the common membranes, but its external surface is not formed into so many gyres or convolutions as ours. Its anterior part is quite solid, of a cineritious colour, and so far has a resemblance of the *corpora striata* as to give rise to the olfactory nerves. The whole of it appears to us as imperfect, and we can scarce determine whether there be any thing analogous to a third or fourth ventricle: neither the *corpus callosum*, *fornix*, *nates*, or *testes*, &c. can be observed here; which parts therefore cannot be imagined as absolutely necessary for the functions of life, since we find these creatures perform them sufficiently well. We may perhaps think these serve a particular use in man, who is a rational creature; but then quadrupeds enjoy them in common with men. These protuberances, &c. seem rather to depend on the different disposition of the several parts, being variously connected and meeting in different directions in different places, than their being absolutely necessary for any particular use; and the uses that have been assigned to different parts of the brain by authors, seem to have no foundation but in the author's fancy.

¹³²
Cranium.

Their organ of *smelling* is very large, and well provided with nerves; hence they have this sensation very acute. Ravens and other birds of prey give a sure proof of this, by their being able to find out their prey, though concealed from their sight and at a considerable distance.

¹³³
The organ
of smell-
ing.

Those birds that grope for their food in the waters, mud, &c. have large nerves, which run quite to the end of their bills, by which they find out and distinguish their food.

The anterior part of their *eyes* (instead of having the scleroic coat continued, so as to make near a sphere as in us) turns all of a sudden flat; so that here the sclerotic makes but half a sphere; and the cornea rises up afterwards, being a portion of a very small and distinct sphere: so that in these creatures there is a much greater difference betwixt the sclerotic and cornea than in us. Hence their eyes do not jut out of their heads, as in man and quadrupeds. As most of these creatures are continually employed in hedges and thickets, therefore, that their eyes might be secured from these injuries, as well as from too much light when flying in the face of the sun, there is a very elegant mechanism in their eyes. A membrane rises from the internal can-

¹³⁴
Eye.

¹³⁵ Of Fowls. thus, which at pleasure, like a curtain, can be made to cover the whole eye; and this by means of a proper muscle that rises from the sclerotic coat, and passing round the optic nerves, runs through the *musculus oculi attollens* (by which however the optic nerves are not compressed) and palpebra, to be inserted into the edge of this membrane. Whenever this muscle ceases to act, the membrane by its own elasticity again discovers the eye. This covering is neither pellucid nor opaque, both which would have been equally inconvenient; but, being somewhat transparent, allows as many rays to enter as to make any object just visible, and is sufficient to direct them in their progression. By means of this membrane it is that the eagle is said to look at the sun. Quadrupeds also, as we mentioned before, have a small *membrana nictitans*.

¹³⁵ Bourse
noire. Its
description
and uses.

Besides, all fowls have another particularity, the use of which is not so well understood; and that is, a pretty long black triangular purse, rising from the bottom of their eye just at the entry of the optic nerve, and stretched out into their vitreous humour, and one would imagine it gave some threads to the crystalline. To this the French (who probably were the first who took notice of it in their dissections before the Royal Academy) gave the name of *bourse noire*. This may possibly serve to suffocate some of the rays of light, that they may see objects more distinctly without hurting their eyes. It has a connection with the vitreous, and seems to be joined also to the crystalline humours. If we suppose it to have a power of contraction (which may be as well allowed as that of the iris), it may so alter the position of the vitreous and crystalline humours, that the rays from any body may not fall perpendicularly upon the crystalline; and this seems to be necessary in them, since they cannot change the figure of the anterior part of their eye so much as we can do: and as this animal is exposed often to too great a number of rays of light, so they have no tapetum, but have the bottom of their eye wholly black on the retina; and in consequence of this, fowls see very ill in the dark.

¹³⁶ Organ of
hearing.

They have no external ear; but in place thereof a tuft of very fine feathers covering the *meatus auditorius*, which easily allows the rays of sound to pass them, and likewise prevents dust or any insect from getting in. An external ear would have been inconvenient in their passing through thickets, and in flying, &c. A liquor is separated in the external part of the ear, or *meatus auditorius*, to lubricate the passage, and further prevent the entrance of any insects, &c. The *membrana tympani* is convex externally; and no muscles are fixed to the bones of their ear, which are rather of a cartilaginous consistence: any tremulous motions impressed on the air are communicated in these creatures merely by the spring and elasticity of these bones; so probably, the membrane is not so stretched as in the human ear by muscles. The semicircular canals are very distinct, and easily prepared.

SECT. III. Anatomy of a Carnivorous Bird.

WE come next to the birds of prey, and for an example shall take a stannel or small hawk. The principal difference to be observed in them, is in their chylipoietic viscera, which may be accounted for from their different way of life.

Immediately under their clavicles, you will observe the oesophagus expanded into their *ingluvies*, which is proportionally less than in the granivorous kind, since their food does not swell so much by maceration; and for the same reason, there is a less quantity of a men-¹³⁷struum to be found here.

They have also a *ventriculus succenturiatus*, plentifully stored with glands, situated immediately above their stomach, which we see here is thin and musculo-membranous, otherwise than in the granivorous kind: and this difference, which is almost the only one we shall find betwixt the two different species of fowls, is easily accounted for from the nature of their food, which requires less attrition, being easier of digestion than that of the other kind; nevertheless, it seems requisite it should be stronger than the human, to compensate the want of abdominal muscles, which are here very thin.

The same mechanism obtains in this creature's *duodenum* that we have hitherto observed. As being a carnivorous animal, its guts are proportionally shorter than those of the granivorous kind: for the reason first given, viz. its food being more liable to corrupt, therefore not proper to be long detained in the body; and for that reason it has no *intestina caeca*, of which the other species of fowls have a pair. The difference in their wings, backs, and claws, are obvious; and have been already in some measure observed.

CHAP. III. The Anatomy of Aqueous Animals.

SECT. I. Of the Amphibious Tribe.

AQUEOUS animals are generally divided into such as have lungs, and such as want them. The first species differ so inconsiderably from an ox or any other quadruped, that a few observations may be sufficient to give an idea of their internal structure; for this purpose, we shall first examine that species of them which most resembles man in the internal structure, the tortoise.

1. *Tortoise* The covering of this animal is composed of a shell so remarkably hard and firm in its texture, that a loaded waggon may go over it without hurting the shell or the animal within it. In the young animal, this shell grows harder in proportion as its contents expand; and this creature never changes its shell as some others do: hence it was necessary for it to be made up of different pieces; and these are more or less distinct in different animals. Their feet are small and weak; and they are exceedingly slow in motion.

It has neither tongue nor teeth; to make up for which, their lips are so hard as to be able to break almost the hardest bodies.

The alimentary canal very much resembles that of the former class.

The principal difference is in the circulation of the blood. The heart has two distinct auricles, without any communication; and under these, there is the appearance of two ventricles similar in shape to those of the former class: but they may be considered as one cavity; for the ventricle sends out not only the pulmonary artery, but likewise the aorta; for there is a passage in the septum, by which the ventricles communicate freely, and the blood passes from the left into

Of Aqueous
Animals.
¹³⁸
¹³⁹ Intestina.

¹³⁸ Ventriculus
succenturi-
atus.

¹³⁹ Intestina.

¹⁴⁰

¹⁴¹ Their shell
or covering.
&c.

Of Aqueous
Animals.

into the right one. From the aorta the blood returns into the right auricle, while that from the pulmonary artery returns to the left auricle, from which it is sent to the left ventricle, &c. so that only a part of the blood is sent to the lungs, the rest going immediately into the aorta; hence the animal is not under the necessity of breathing so often as otherwise it would be.

142
Blood-vessels.

From the base of the right ventricle goes out the pulmonary artery and aorta. The pulmonary artery is spent upon the lungs. The aorta may be said to be three in number: for the aorta sinistra ascends through the pericardium in company with the pulmonary artery; and afterwards turns down, and sends off a considerable branch, which splits into two; one of which joins the right aorta, while the other is distributed upon the liver, stomach, intestines, &c. What remains of this aorta runs to the kidneys or posterior extremities of that side. An aorta descendens, &c. after piercing the pericardium, runs down and communicates with the branch already mentioned, is distributed upon the right kidney and inferior extremity, and also upon the bladder and parts of generation. An aorta ascendens, after getting out of the pericardium, supplies the fore-legs, neck, and head. The blood in the superior part of the body returns to the right auricle by two jugular veins, which unite after perforating the pericardium. From the inferior part, it returns to the same auricle by two large veins; one on the right side receives the blood in the right lobe of the liver; the other on the left side receives the blood in the left lobe, and also a trunk which corresponds with the inferior vena cava in other animals. The pulmonary vessels run in the left auricle in the common way.

The absorbent system in the turtle, like that in the former class, consists of lacteals and lymphatics, with their common trunks the thoracic ducts; but differs from it in having no obvious lymphatic glands on any part of its body, nor plexus formed at the termination in the red veins.

143
Lacteals.

The *lacteals* accompany the blood-vessels upon the mesentery, and form frequent net-works across these vessels: near the root of the mesentery a plexus is formed, which communicates with the lymphatics coming from the kidneys and parts near the anus. At the root of the mesentery on the left side of the spine, the lymphatics of the spleen join the lacteals; and immediately above this a plexus is formed, which lies upon the right aorta. From this plexus a large branch arises, which passes behind the right aorta to the left side, and gets before the left aorta, where it assists in forming a very large receptaculum, which lies upon that artery.

From this receptaculum arise the thoracic ducts. From its right side goes one trunk, which is joined by that large branch that came from the plexus to the left side of the right aorta, and then passes over the spine. This trunk is the thoracic duct of the right side; for having got to the right side of the spine, it runs upwards, on the inside of the right aorta, towards the right subclavian vein; and when it has advanced a little above the lungs, it divides into branches, which near the same place are joined by a large branch, that comes up on the outside of the aorta. From this part

upwards, those vessels divide and subdivide, and are afterwards joined by the lymphatics of the neck, which likewise form branches before they join those from below. So that between the thoracic duct and the lymphatics of the same side of the neck, a very intricate net-work is formed; from which a branch goes into the angle between the jugular vein and the lower part or trunk of the subclavian. This branch lies therefore on the inside of the jugular vein, whilst another gets to the outside of it, and seems to terminate in it, a little above the angle, between that vein and the subclavian.

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Into the above mentioned receptaculum the lymphatics of the stomach and duodenum likewise enter. Those of the duodenum run by the side of the pancreas, and probably receive its lymphatics and a part of those of the liver. The lymphatics of the stomach and duodenum have very numerous anastomoses, and form a beautiful net-work on the artery which they accompany. From this receptaculum likewise (besides the trunk already mentioned, which goes to the right side) arise two other trunks pretty equal in size; one of which runs upon the left side, and the other upon the right side of the left aorta, till they come within two or three inches of the left subclavian vein; where they join behind the aorta, and form a number of branches which are afterwards joined by the lymphatics of the left side of the neck; so that here a plexus is formed as upon the right side. From this plexus a branch issues, which opens into the angle between the jugular and subclavian vein.

144

Lymphatics.

2. *Serpent and Crocodile.* The circulation in these is similar to that of the turtle; but we find only one ventricle. The blood goes from the right auricle to the ventricle which sends out the pulmonary artery and aorta; the blood from the pulmonary artery returns to the left auricle, that from the aorta going to the right auricle, and both the auricles opening into the ventricle.

145

Circulation in serpents, &c.

3. *Frog and Lizard.* These differ from the former animals, in having only one auricle and a ventricle: and besides, the ventricle sends out a single artery, which afterwards splits into two parts; one to supply the lungs, the other runs to all the rest of the body: from the lungs and from the other parts, the blood returns into the auricle.

SECT. II. *Anatomy of Fishes.*

Of these we may first observe, that they have a very strong thick *cuticle*, covered with a great number of scales, laid one on another like the tiles of houses. This among other arguments is supposed to prove the human epidermis to be of a squamous structure: but the scales resemble the hairs, wool, feathers, &c. of the creatures that live in air; and below these we observe their proper *cuticula* and *cutis*.

146

Cuticula, of likeness to the human.

The generality of fishes, particularly those shaped like the cod, haddock, &c. have a line running on each side. These lines open externally by a number of ducts, which throw out a mucous or slimy substance that keeps them soft and clammy, and seems to serve the same purpose with the mucous glands or ducts which are placed within many of our internal organs.

147

Swimming, how performed.

In the next place, these creatures have neither anterior nor posterior extremities, as quadrupeds and fowls; for their progression is performed in a different way from

Several uses of their fins, tail, airbags, &c.

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from either of those species of animals: for this purpose they are provided with machines, properly consisting of a great number of elastic beams, connected to one another by firm membranes, and with a tail of the same texture; their spine is very moveable towards the posterior part, and the strongest muscles of their bodies are inserted there. Their tails are so framed as to contract to a narrow space when drawn together to either side, and to expand again when drawn to a straight line with their bodies; so, by the assistance of this broad tail, and the fins on their sides, they make their progression much in the same way as a boat with oars on its sides and rudder at its stern. The perpendicular fins situated on the superior part of their body keep them in *aequilibrio*, hindering the belly from turning uppermost; which it would readily do, because of the air-bag in the abdomen rendering their belly specifically lighter than their back; but by the resistance these fins meet with when inclined to either side, they are kept with their backs always uppermost.

The best account of this matter, we have in the treatise before mentioned, viz. *Borellius de Motu Animalium*, cap. 23.

It may be next observed, that these creatures have nothing that can be call a *neck*, seeing they seek their food in an horizontal way, and can move their bodies either upwards or downwards, as they have occasion, by the contraction or dilatation of the air-bag; a long neck, as it would hinder their progression, would be very disadvantageous in the element they live in.

The *abdomen* is covered on the inferior part with a black-coloured thin membrane resembling our peritoneum. It is divided from the thorax by a thin membranous partition, which has no muscular appearance; so that we have now seen two different sorts of animals that have no muscular diaphragm.

148
Teeth, for
what made.

These creatures are not provided with *teeth* proper for breaking their aliment into small morsels, as the food they use is generally small fishes, or other animals that need no trituration in the mouth, but spontaneously and gradually dissolve into a liquid chyle. Their teeth serve to grasp their prey, and hinder the creatures they have once caught from escaping again. For the same purpose, the internal cartilaginous basis of the bronchi, and the two round bodies situated in the posterior part of the jaws, have a great number of tenter-hooks fixed into them, in such a manner as that any thing can easily get down, but is hindered from getting back. The water that is necessarily taken in along with their food in too great quantities to be received into their jaws in deglutition, passes betwixt the interstices of the bronchi and the flap that covers them. The compression of the water on the bronchi is of considerable use to the creature, as we shall explain by and by.

149
Digestion
performed
solely by a
menstruum.

The *oesophagus* in these creatures is very short, and scarcely distinguished from their stomach, seeing their food lies almost equally in both. The stomach is of an oblong figure. There are commonly found small fishes in the stomach of large ones still retaining their natural form; but when touched, they melt down into a jelly. From this, and the great quantity of liquors poured into their stomachs, we may conclude, that digestion is solely brought about in them by the dissolving

power of a menstruum, and that no trituration happens here.

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The *guts* in these animals are very short, making only three turns; the least of which ends in the common cloaca for the feces, urine, and semen, situated about the middle of the inferior part of their bodies.

150
Intestina.

To what we call *pancreas*, some give the name of *intestinula caeca*: it consists of a very great number of small threads, like so many little worms, which all terminate at last in two larger canals that open into the first gut, and pour into it a viscous liquor much about the place where the biliary ducts enter. That kind of pancreas formed of *intestinula caeca* is peculiar to a certain kind of fishes; for the cartilaginous, broad, and flat kind, as the skate, sole, flounder, &c. have a pancreas resembling that of the former class of animals. Their intestines are connected to the back-bone by a membrane analogous to a mesentery.

151
Pancreas.

Their *liver* is very large, of a whitish colour, and lies almost in the left side wholly, and contains a great deal of fat or oil.

152
Liver, gall-
bladder,
and their
ducts.

The *gall-bladder* is situated a considerable way from their liver; and sends out a canal, the cystic duct, which joins with the hepatic duct just at the entry into the gut. Some fibres being observed stretched from the liver to the gall-bladder, but without any apparent cavity, the bile was supposed not to be carried into the gall-bladder in the usual way, but that it must either be secreted on the sides of the sac, or regurgitate into it from the canalis choledochus. It is certain, however, that hepato-cystic ducts exist in fish as well as in fowls. This, for example, is very obvious in the salmon, where large and distinct ducts run from the biliary ducts of the liver, and open into the gall-bladder.

The *spleen* is placed near the back-bone, and at a place where it is subjected to an alternate pressure from the constriction and dilatation of the air-bag, which is situated in the neighbourhood. Since, in all the different animals we have dissected, we find the spleen attached to somewhat that may give it a conqassation; as in the human subject and quadrupeds, it is contiguous to the diaphragm; in fowls, it is placed betwixt the back-bone, the liver, and stomach; in fishes, it lies on the saccus aërius: and since we find it so well served with blood-vessels, and all its blood returning into the liver; we must not conclude the spleen to be an *inutile pondus*, only to serve as a balance to the animal *pro aequilibrio*, but particularly designed for preparing the blood to the liver.

153
Spleen, its
use drawn
from ana-
logy.

The only *organs of generation* in this animal are two bags situated in the abdomen uniting near the podex. These in the male are filled with a whitish firm substance called the *milt*; and in the female with an infinite number of little ova clustered together, of a reddish yellow colour, called the *roe*. Both these at spawning-time we find very much distended; whereas at another time the male organs can scarce be distinguished from the female; nor is there any proper instrument in the male for throwing the seed into the organs of the female, as in other creatures. We shall not take upon us to determine the way whereby the female sperm is impregnated: but we find that the spawn of frogs consists in the small specks wrapped up in a whitish glutinous liquor; these specks are the rudiments of the young frogs, which are nourished in that liquor till

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Organs of
generation.

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till they are able to go in search of their food. In the same way, the ova of fishes are thrown out and deposited in the sand, the male being for the most part ready to impregnate them, and they are incubated by the heat of the sun. It is curious enough to remark with what care they seek for a proper place to deposit their ova, by swimming to the shallow, where they can better enjoy the sun's rays, and shun the large jaws of other fishes. The river-fishes, again, spawn in some creek free from the hazard of the impetuous stream. But whether this mixture be brought about in fishes by a simple application of the genitals to each other, or if both of them throw out their liquors at the same time in one place, and thus bring about the desired mixture, it is not easy to determine. Spallanzani has found, that the eggs of frogs, toads, and water mewts, are not fecundated in the body of the female; that the male emits his semen upon the spawn while it is flowing from the female; and that the foetus pre-exists in the body of the female: but whether impregnation takes place in the same manner in fishes, he has not yet been able to determine, though he seems to think it probable. These creatures are so shy, that we cannot easily get to observe their way of copulation, and are consequently but little acquainted with their natural history. Frogs, it is very evident, do not copulate: at least no farther than to allow both sexes an opportunity of throwing their sperm. Early in the spring the male is found for several days in close contact upon the back of the female, with his fore legs round her body in such a manner that makes it very difficult to separate them, but there is no communication. At this time the female lays her spawn in some place that is most secure, while the male emits his sperm upon the female spawn.

155
The air-
bladder,
and its
uses.

After raising up the black peritoneum in fishes, there comes in view an oblong white membranous bag, in which there is nothing contained but a quantity of elastic air. This is the *swimming-bladder*: it lies close to the back-bone; and has a pretty strong muscular coat, whereby it can contract itself. By contracting this bag, and condensing the air within it, they can make their bodies specifically heavier than water, and so readily fall to the bottom; whereas the muscular fibres ceasing to act, the air is again dilated, and they become specifically lighter than water, and so swim above. According to the different degrees of contraction and dilatation of this bladder, they can keep higher or lower in the water at pleasure. Hence flounders, soles, raia or skate, and such other fishes as want this sac, are found always groveling at the bottom of the water: it is owing to this that dead fishes (unless this membrane has been previously broke) are found swimming a-top, the muscular fibres then ceasing to act, and that with their bellies uppermost; for the back-bone cannot yield, and the distended sac is protruded into the abdomen, and the back is consequently heaviest at its upper part, according to their posture. There is here placed a glandular substance, containing a good quantity of red blood; and it is very probable that the air contained in the swimming bladder is derived from this substance. From the anterior part of the bag go out two *processes* or *appendices*, which, according to the gentlemen of the French academy, ter-

156
Its process-
sus, or com-
munication
with the
ventriculus.

minate in their fauces: In a variety of other fishes we find communications with some parts of the alimentary canal, particularly the oesophagus and stomach. The salmon has an opening from the fore end of the air-bag into the oesophagus, which is surrounded by a kind of muscular fibres. The herring has a funnel-like passage leading from the bottom of the stomach into the air-bag; but it is not determined whether the air enters the air-bag by this opening, or comes out by it: the latter, however, seems to be the more probable opinion, as the glandular body is found in all fishes, whereas there are several without this passage of communication.

At the superior part of this bag there are other red-coloured bodies of a glandular nature, which are connected with the kidneys. From them the *ureters* go down to their insertion in the *vesica urinaria*, which lies in the lower part of the abdomen; and the urethra is there produced, which terminates in the podex.

These last-mentioned parts have not hitherto been observed in some species of fishes; whence authors too hastily denied them in all. These creatures have a *membranous diaphragm*, which forms a sac in which the heart is contained. It is very tense, and almost perpendicular to the vertebræ.

The *heart* is of a triangular form, with its base downwards, and its apex uppermost; which situation it has because of the *branchiæ*. It has but one *auricle* and one *ventricle*, because they want lungs; and one great artery. The size of the auricle and that of the ventricle are much the same; the artery sends out numberless branches to the *branchiæ* or gills. And what is rather curious, this artery, instead of supporting all parts as in the frog, is distributed entirely upon the gills; every branch terminating there, and becoming so extremely small as at last to escape the naked eye.

The *branchiæ* lie in two large slits at each side of their heads, and seem to be all they have that bears any analogy to lungs. Their form is semicircular: they have a vast number of red fibrillæ standing out on each side of them like a fringe, and very much resemble the vane of a feather. These *branchiæ* are perpetually subjected to an alternate motion and pressure from the water; and we may here remark, that we have not found any red blood but in places subjected to this alternate pressure. This observation will help us in explaining the action of the lungs upon the blood. Over these gills there is a large flap, allowing a communication externally; by which the water they are obliged to take into their mouths with their food finds an exit without passing into their stomach: it is owing to these flaps coming so far down that the heart is said commonly to be situated in their heads. The blood is collected again from the gills by a vast number of small veins, somewhat in the same manner as in our pulmonary vein; but instead of going back to the heart a second time, they immediately unite, and form an *aorta descendens*, without the intervention of an auricle and ventricle. Hence a young anatomist may be puzzled to find out the power by which the blood is propelled from the gills to the different parts of the body; but the difficulty will be considerably lessened when we consider the manner in which the blood is carried

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157
Ureters ve-
fica urina-
ria.
Urethra.

158
Diaphragm

159
The heart
has but one
auricle and
one ven-
tricle.

160
The bran-
chia.
Their struc-
ture and
use.

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carried through the liver from the intestines in man and quadrupeds. The aorta in fishes sends off branches which supply all the parts of the body excepting the gills. From the extremity of those branches the blood returns to the heart somewhat in the same manner as in the former class of animals; only there are two inferior venæ cavæ, whereas the former has but one.

Absorbent System in Fishes. We shall take the haddock as a general example: for the other fishes, particularly those of the same shape, will be found in general to agree with it.

161
Lymphatic
vessels.

On the middle of the belly of a haddock, immediately below the outer skin, a lymphatic vessel runs upwards from the anus, and receives branches from the parietes of the belly, and from the fin below the anus: near the head this lymphatic passes between the two pectoral fins; and having got above them, it receives their lymphatics. It then goes under the symphysis of the two bones which form the thorax, where it opens into a net-work of very large lymphatics, which lie close to the pericardium, and almost entirely surrounds the heart. This net-work, besides that part of it behind the heart, has a large lymphatic on each side, which receives lymphatics from the kidney, runs upon the bone of the thorax backwards; and when it has got as far as the middle of that bone, it sends off a large branch from its inside to join the thoracic duct. After detaching this branch, it is joined by the lymphatics of the thoracic fins, and soon after by a lymphatic which runs upon the side of the fish. It is formed of branches, which give it a beautiful penniform appearance.

Besides these branches, there is another set deeper which accompanies the ribs. After the large lymphatic has been joined by the above-mentioned vessels, it receives lymphatics from the gills, orbit, nose, and mouth. A little below the orbit, another net-work appears, consisting in part of the vessels above described, and of the thoracic duct. This net-work is very complete, some of its vessels lie on each side of the muscles of the gills; and from its internal part a trunk is sent out which terminates in the jugular vein.

162
The lacteals

The lacteals run on each side of the mesenteric arteries, anastomosing frequently across those vessels. The receptaculum into which they enter is very large, in proportion to them; and consists at its lower part of two branches, of which one lies between the duodenum and stomach, and runs a little way upon the pancreas, receiving the lymphatics of the liver, pancreas, those of the lower part of the stomach, and the lacteals from the greatest part of the small intestines. The other branch of the receptaculum receives the lymphatics from the rest of the alimentary canal. The receptaculum formed by these two branches lies on the right side of the upper part of the stomach, and is joined by some lymphatics in that part, and also by some from the sound and gall-bladder, which in this fish adheres to the receptaculum. This thoracic duct takes its rise from the receptaculum, and lies on the right side of the œsophagus, receiving lymphatics from that part: and running up about half an inch, it divides into two ducts, one of which passes over the œsophagus to the left side, and the other goes straight upon the right side, passes by the upper part of the kidney, from which it receives some small branches,

and soon afterwards is joined by a branch from the large lymphatic that lies above the bone of the thorax, as formerly mentioned: near this part it likewise sends off a branch to join the duct of the opposite side; and then, a little higher, is joined by those large lymphatics from the upper part of the gills, and from the fauces.

The thoracic duct, after being joined by these vessels, communicates with the net-work near the orbit, where its lymph is mixed with that of the lymphatics from the posterior part of the gills, and from the superior fins, belly, &c. and then from this net-work, a vessel goes into the jugular vein just below the orbit. This last vessel, which may be called the termination of the whole system, is very small in proportion to the net-work from which it rises; and indeed the lymphatics of the part are so large, as to exceed by far the size of the sanguiferous vessels.

The thoracic duct from the left side, having passed under the œsophagus from the right, runs on the inside of the vena cava of the left side, receives a branch from its fellow of the opposite side, and joins the large lymphatics which lie on the left side of the pericardium, and a part of those which lie behind the heart; and afterwards makes, together with the lymphatics from the gills, upper fins, and side of the fish, a net-work, from which a vessel passes into the jugular vein of this side. In a word, the lymphatics of the left side agree exactly with those of the right side above described. Another part of the system is deeper seated, lying between the roots of the spinal processes of the back-bone. This part consists of a large trunk that begins from the lower part of the fish, and as it ascends receives branches from the dorsal fins and adjacent parts of the body. It goes up near the head, and sends a branch to each thoracic duct near its origin.

The brain in fishes is formed pretty much in the same way as that of fowls; only we may observe, that the posterior lobes bear a greater proportion to the anterior.

Their organ of *smelling* is large; and they have a power of contracting and dilating the entry into their nose as they have occasion. It seems to be mostly by their acute smell that they discover their food: for their tongue seems not to have been designed for a very nice sensation, being of a pretty firm cartilaginous substance; and common experience evinces, that their sight is not of so much use to them as their smell in searching for their nourishment. If you throw a fresh worm into the water, a fish shall distinguish it at a considerable distance; and that this is not done by the eye, is plain from observing, that after the same worm has been a considerable time in the water and lost its smell, no fishes will come near it: but if you take out the bait, and make several little incisions into it, so as to let out more of the odoriferous effluvia, it shall have the same effect as formerly. Now it is certain, had the creatures discovered this bait with their eyes, they would have come equally to it in both cases. In consequence of their smell being the principal means they have of discovering their food, we may frequently observe their allowing themselves to be carried down with the stream, that they may ascend again leisurely against the current of the water; thus the odoriferous particles swimming in that medium, being

Of Aqueous Animals. applied more forcibly to their smelling organs, produce a stronger sensation.

165
Optic nerve.

The optic nerves in these animals are not confounded with one another in their middle progress betwixt their origin and the orbit, but the one passes over the other without any communication; so that the nerve that comes from the left side of the brain goes distinctly to the right eye, and *vice versa*.

Indeed it would seem not to be necessary for the optic nerves of fishes to have the same kind of connection with each other as those of man have: for their eyes are not placed in the fore-part, but in the sides of their head; and of consequence, they cannot so conveniently look at any object with both eyes at the same time.

166
The crystalline humour a complete sphere, and why.

The lens crystallina is here a complete sphere, and more dense than in terrestrial animals, that the rays of light coming from water might be sufficiently refracted.

As fishes are continually exposed to injuries in the uncertain element they live in, and as they are in perpetual danger of becoming a prey to the larger ones, it was necessary that their eyes should never be shut; and as the cornea is sufficiently washed by the element they live in, they are not provided with palpebræ: but then, as in the current itself the eye must be exposed to several injuries, there was a necessity it should be sufficiently defended; which in effect it is by a firm pellucid membrane, that seems to be a continuation of the cuticula, being stretched over here. The epidermis is so very proper for this purpose, as being insensible and destitute of vessels, and consequently not liable to obstructions, or, by that means, of becoming opaque. In the eye of the skate tribe, there is a digited curtain which hangs over the pupil, and may shut out the light when the animal rests, and it is similar to the tunica adnata of other animals.

167
Organs of hearing.

Although it was formerly much doubted whether fishes possessed a sense of hearing, yet there can be little doubt of it now; since it is found that they have a complete organ of hearing as well as other animals, and likewise as the water in which they live is proved to be a good medium. Fishes, particularly those of the skate kind, have a bag at some distance behind the eyes, which contains a fluid and a soft cretaceous substance, and supplies the place of vestibule and cochlea. There is a nerve distributed upon it, similar to the portio mollis in man. They have three semicircular canals, which are filled with a fluid, and communicate with the bag: they have likewise, as the present professor of anatomy at Edinburgh has lately discovered, a meatus externus, which leads to the internal ear. The cod fish, and others of the same shape, have an organ of hearing somewhat similar to the former; but instead of a soft substance contained in the bag, there is a hard cretaceous stone. In this kind of fish no meatus externus has been yet observed: And Dr Monro is inclined to think that they really have not one, from the consideration that the common canal or vestibule, where the three semicircular canals communicate, is separated from the cavity of the cranium by a thin membrane only; that this cavity, in the greater number of fishes, contains a watery liquor in considerable quantity; and that, by the thinness of the cranium, the tremor excited by a sonorous body may readily and easily be transmitted

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through the cranium to the water within it, and so to the ear.

Of Insects.

CHAP. IV. The Anatomy of Insects.

As insects and worms are so exceedingly numerous, it would be endless to examine all the different kinds, nor would it serve any useful purpose to the anatomist. We shall therefore be content with making a few general observations, and these chiefly on the structure of their body; leaving the variety of their colour, shape, &c. to the naturalists. Insects differ from the former classes, by their bodies being covered with a hard crust or scale, by their having feelers or antennæ arising from their head, and many of them breathing the air through lateral pores. As to the shape of their bodies, though it somewhat differs from that of birds, being in general not so sharp before to cut and make way through the air, yet it is well adapted to their manner of life. The base of their bodies is not formed of bone, as in many other animals, but the hard external covering serves them for skin and bone at the same time. Their feelers, beside the use of cleaning their eyes, are a guard to them in their walk or flight. Their legs and wings are well fitted for their intended service; but the latter vary so much in different insects, that from them naturalists have given names to the several orders of the class. As, first, the

Coleoptera, or beetle tribe, which have a crustaceous elytra or shell, that shuts together, and forms a longitudinal suture down their back.

Hemiptera—as in cimeter, cockroach, bug, &c. which have the upper wings half crustaceous and half membranaceous; not divided by a longitudinal future, but incumbent on each other.

Lepidoptera—as the butterfly, have four wings, covered with fine scales in the form of powder.

Neuroptera—as the dragon-fly, spring-fly, &c. have four membranaceous transparent naked wings, generally reticulated.

Hymenoptera—as wasps, bees, &c. have four membranaceous wings, and a tail furnished with a sting.

Diptera—as the common house-fly, have only two wings.

Aptera—as the lobster, crab, scorpion, spider, &c. have no wings.

The structure of the eye in many insects is a most curious piece of mechanism. The outer part is remarkably hard, to guard against injuries; and has commonly a reticular appearance, or the whole may be looked upon as an assemblage of smaller eyes; but whether they see objects multiplied before them, has not yet been determined.

Linnæus, and several others following him, deny the existence of a brain in these creatures. But it is certain, that at least a number of the larger kinds, as the lobster, crab, &c. have a soft substance similar to the brain, from which the optic and other nerves take their rise; besides, when this substance is irritated, the animal is thrown into convulsions: hence we would conclude, that insects have a brain as well as the former classes, although this is smaller in proportion to their bodies.

Their ear has been lately discovered to be placed at the root of their antennæ or feelers, and can be

M m

di-

Of Insects. distinctly seen in some of the larger kinds, as the lobster.

They have a stomach, and other organs of digestion; and it is curious, that in some, as the lobster, the teeth are found in the stomach.

They have a heart and blood-vessels, and circulation is carried on in them somewhat as in the former class; but the blood is without red globules; or, as naturalists speak, is colourless. In the lobster, and others of the larger kind, when a piece of the shell is broken, the pulsation of the heart is seen distinctly, and that sometimes for several hours after it has been laid bare.

Lungs. The existence of these by some has been denied. But late experiments and observations show, that no species want them, or at least something similar to them; and in many insects, they are larger in proportion than in other animals: in most of them they lie on or near the surface of their body; and send out lateral pores or tracheæ, by which, if the animal is bismearied with oil, it is instantly suffocated.

Generation. The same difference in sex exists in insects as in other animals, and they even appear more disposed to increase their species; many of them, when become perfect, seeming to be created for no other purpose but to propagate their like. Thus the silk-worm, when it arrives at its perfect or moth-state, is incapable of eating, and can hardly fly; it endeavours only to propagate its species: after which the male immediately dies, and so does the female as soon as she has deposited her eggs.

Besides those of the male and female, a third sex exists in some insects, which we call *neuter*. As these have not the distinguishing parts of either sex, they may be considered as eunuchs or infertile. We know of no instance of this kind in any other class of animals; and it is only found among those insects which form themselves into societies, as bees, wasps, and ants: and here these eunuchs are real slaves, as on them lies the whole business of the economy. No hermaphrodites have as yet been discovered among insects.

Many have imagined that the generality of insects were merely the production of putrefaction, because they have been observed to arise from putrified substances: but a contrary opinion is now more generally adopted; and it is pretty certain, that if putrid bodies be shut up in a close vessel, no insects are ever generated unless their ova have been originally deposited there. They are oviparous animals, and lay their eggs in places most convenient for the nourishment of their young; some in water, others in flesh; some in fruit and leaves: while others make nests in the earth or in wood, and sometimes even in the hardest stone. The

eggs of all insects first become (*larva*) caterpillar, or Of Worms. maggot; from which they are changed into (*pupa*) chrysalis or aurelia, so named from their being inclosed in a case; and these dying, or seeming to die, the (*imago*) fly, or butterfly or perfect state, succeeds; and during each of these changes their appearance differs wonderfully.

CHAP. V. Of Worms.

WITH respect to this class of animals, they have characters corresponding with those of the former tribe, but are distinguished from them in having no antennæ, and in being furnished with tentacula.

Many of them, particularly those without shells, are remarkably tenacious of life, sometimes capable of being new formed from a part which may have been separated. By much the greater number of them are destitute of head, ears, nose, eyes, and feet.

Some of those in the first order, as the common round worms, have a vascular and nervous system, with the parts of generation, which can be distinctly seen. Some, as the cuttle fish, form a kind of connection between fishes and worms, in possessing gills but wanting fins, &c. while others, as those of the lowest order, or zoophyta, join the properties of the animal and vegetable kingdom together.

The class is divided by Linnæus, &c. into the following orders, viz.

Intestina—as the earth worm, leech, &c. which are the most simple animals, being perfectly naked, and without limbs of any kind.

Mollusca—as the naked snail, sea-star, cuttle fish; which are likewise simple animals without any shell, but they are brachiated or furnished with a kind of limbs.

Testacea—as the snail, oyster, &c. which have the same characters as the former order, but are covered with a shell, and include the greater part of what we commonly call *shell-fish*.

Lithophyta—as corals, madrepore, &c. which are compound animals fixed upon a calcareous base, constructed by the creatures themselves.

Zoophyta—as the sponge, polypus, &c. These are likewise compound animals, furnished with a kind of flowers, and having a vegetating root and stem.

Some of these creatures inhabit the earth, others live on the rest of the animal or on the vegetable kingdom, and many are found in the hardest stones; while an innumerable tribe of them live in the waters. In general, they are said to be of the hermaphrodite and oviparous kind; while the lowest class, as the polypi, in a great measure resemble the vegetable kingdom in their manner of growth.

C O M

COMPARATIVE Degree, among grammarians, that between the positive and superlative degrees, expressing any particular quality above or beneath the level of another.

COMPARISON, in a general sense, the consideration of the relation between two persons or things,

C O M

when opposed and set against each other, by which we judge of their agreement or difference.

COMPARISON of Ideas, an act of the mind, whereby its compares its ideas one with another, in respect of extent, degree, time, place, or any other circumstances. See *IDEA*.

Brutes

Compari-
son.

Brutes seem not to have this faculty in any great degree: they have, probably, several ideas distinct enough; but cannot compare them farther than as to some sensible circumstances annexed to the objects themselves; the power of comparing general ideas, which we observe in men, we may probably conjecture they have not at all.

COMPARISON, in grammar, the inflection of the comparative degree. See GRAMMAR.

COMPARISON, in rhetoric, is a figure whereby two things are considered with regard to some third, which is common to them both.

Instruction is the principal, but not the only end of comparison. It may be employed with success in putting a subject in a strong point of view. A lively idea is formed of a man's courage by likening it to that of a lion; and eloquence is exalted in our imagination comparing it to a river overflowing its bank, and involving all in its impetuous course. The same effect is produced by contrast: a man in prosperity becomes more sensible of his happiness, by comparing his condition with that of a person in want of bread. Thus comparison is subservient to poetry as well as to philosophy.

Comparisons serve two purposes: when addressed to the understanding, their purpose is to instruct; when to the heart, their purpose is to please. Various means contribute to the latter: 1st, the suggesting some unusual resemblance or contrast*; 2d, the settling an object in the strongest light; 3d, the associating an object with others that are agreeable; 4th, the elevating an object; and 5th, the depressing it. And that comparisons may give pleasure by these various means, will be made evident by examples which shall be given, after premising some general observations.

Objects of different senses cannot be compared together; for such objects are totally separated from each other, and have no circumstance in common to admit either resemblance or contrast. Objects of hearing may be compared together, as also of taste, of smell, and of touch: but the chief fund of comparison are objects of sight; because, in writing or speaking, things can only be compared in idea, and the ideas of sight are more distinct and lively than those of any other sense.

When a nation emerging out of barbarity begins to think of the fine arts, the beauties of language cannot long lie concealed; and when discovered, they are generally, by the force of novelty, carried beyond all bounds of moderation. Thus, in the earliest poems of every nation, we find metaphors and similes founded on the slightest and most distant resemblances, which, losing their grace with their novelty, wear gradually out of repute; and now, by the improvement of taste, no metaphor nor simile is admitted into any polite composition but of the most striking kind. To illustrate this observation, a specimen shall be given afterward of such metaphors as we have been describing: with respect to similes take the following specimen:

"Behold, thou art fair, my love: thy hair is as
"a flock of goats that appear from Mount Gilead:
"thy teeth are like a flock of sheep from the wash-
"ing, every one bearing twins: thy lips are like
"a thread of scarlet: thy neck like the tower of

Compari-
son.

"David built for an armoury, whereon hang a
"thousand shields of mighty men: thy two breasts
"like two young roes that are twins, which feed
"among the lilies: thy eyes like the fish-pools in
"Hesbon, by the gate of Bath-rabbin: thy nose
"like the tower of Lebanon, looking toward Da-
"mascus."

Song of Solomon.

"Thou art like snow on the heath; thy hair like
"the mist of Cromla, when it curls on the rocks
"and shines to the beam of the west: thy breasts
"are like two smooth rocks seen from Branno of
"the streams: thy arms like two white pillars in
"the hall of the mighty Fingal."

Fingal.

It has no good effect to compare things by way of simile that are of the same kind; nor to contrast things of different kinds. The reason is given in the article above cited on the margin, and shall be here illustrated by examples. The first is a comparison built upon a resemblance so obvious as to make little or no impression. Speaking of the fallen angels searching for mines of gold:

A numerous brigade hasten'd: as when bands
Of pioneers with spade and pick-axe arm'd,
Forerun the royal camp to trench a field
Or cast a rampart.

Milton.

The next is of things contrasted that are of different kinds.

Queen. What, is my Richard both in shape and mind

Transform'd and weak? Hath Bolingbroke depos'd
Thine intellect? Hath he been in thy heart?
The lion, dying, thrusteth forth his paw,
And wounds the earth, if nothing else with rage
To be o'erpowered: and wilt thou, pupil like,
Take thy correction mildly, kiss the rod,
And fawn on rage with base humility?

Richard II. act. 5. sc. 1.

This comparison has scarce any force: a man and a lion are of different species, and therefore are proper subjects for a simile; but there is no such resemblance between them in general, as to produce any strong effect by contrasting particular attributes or circumstances.

A third general observation is, That abstract terms can never be the subject of comparison, otherwise than by being personified. Shakespear compares adversity to a toad, and slander to the bite of a crocodile; but in such comparisons these abstract terms must be imagined sensible beings.

To have a just notion of comparisons, they must be distinguished into two kinds; one common and familiar, as where a man is compared to a lion in courage, or to a horse in speed; the other more distant and refined, where two things that have in themselves no resemblance or opposition, are compared with respect to their effects. There is no resemblance between a flower-plot and a cheerful song; and yet they may be compared with respect to their effects, the emotions they produce in the mind being extremely similar. There is as little resemblance between fraternal concord and precious ointment; and yet observe how successfully they are compared with respect to the impressions they make.

"Behold, how good and how pleasant it is for
"brethren to dwell together in unity. It is like
M m 2 "the

* See the
article
RESEM-
BLANCE
and Dissimi-
litude.

Comparison.

" the precious ointment upon the head, that ran
" down upon Aaron's beard, and descended to the
" skirts of his garment." *Psalms 133.*

For illustrating this sort of comparison, we shall add some more examples :

" Delightful is thy presence, O Fingal ! it is like
" the sun on Cromla, when the hunter mourns his
" absence for a season, and sees him between the
" clouds.

" Did not Ossian hear a voice ? or is it the sound
" of days that are no more ? Often, like the evening-
" sun, comes the memory of former times on my
" soul.

" His countenance is settled from war ; and is
" calm as the evening-beam, that from the cloud
" of the west looks on Cona's silent vale." *Fingal.*

We now proceed to illustrate, by particular instances, the different means by which comparisons, whether of the one sort or the other, can afford pleasure ; and, in the order above established, we shall begin with such instances as are agreeable, by suggesting some unusual resemblance or contrast.

Sweet are the uses of Adversity,
Which, like the toad, ugly and venomous,
Wears yet a precious jewel in her head.

As you like it, act 2. sc. 1.

See, how the morning opens her golden gates,
And takes her farewell of the glorious sun ;
How well resembles it the prime of youth,
Trim'd like a yonker prancing to his love.

Second Part Henry VI. act 2. sc. 1.

Thus they their doubtful consultations dark
Ended, rejoicing in their matchless chief :
As when from mountain tops, the dusky clouds
Ascending, while the North-wind sleeps, o'erspread
Heav'n's cheerful face, the lowering element
Scowls o'er the darken'd landscape, snow, and
shower ;

If chance the radiant sun with farewell sweet
Extends his evening-beam, the fields revive,
The birds their notes renew, and bleating herds
Attest their joy, that hill and valley rings.

Paradise Lost, book 2.

None of the foregoing similes tend to illustrate the principal subject : and therefore the chief pleasure they afford must arise from suggesting resemblances that are not obvious : for undoubtedly a beautiful subject introduced to form the simile affords a separate pleasure, which is felt in the similes mentioned, particularly in that cited from Milton.

The next effect of a comparison in the order mentioned, is to place an object in a strong point of view ; which effect is remarkable in the following similes.

As when two scales are charg'd with doubtful loads,
From side to side the trembling balance nods,
(While some laborious matron, just and poor,
With nice exactness weighs her woolly store),
Till pois'd aloft, the resting beam suspends
Each equal weight ; nor this nor that descends :
So stood the war, till Hector's matchless might,
With fates prevailing, turn'd the scale of fight.
Fierce as a whirlwind up the wall he flies,
And fires his host with loud repeated cries.

Iliad, b. xii. 521.

Comparison.

— — — She never told her love ;
But let concealment, like a worm i' th' bud,
Feed on her damask cheek : she pin'd in thought ;
And with a green and yellow melancholy,
She sat like patience on a monument,
Smiling at grief. *Twelfth Night, act 2. sc. 6.*

" There is a joy in grief when peace dwells with
" the sorrowful. But they are walted with mourn-
" ing, O daughter of Toscar, and their days are
" few. They fall away like the flower on which
" the sun looks in his strength, after the mildew
" has passed over it, and its head is heavy with the
" drops of night." *Fingal.*

— — — Out, out, brief candle !
Life's but a walking shadow, a poor player,
That struts and frets his hour upon the stage,
And then is heard no more.

Macbeth, act 5. sc. 5.

O thou goddess,
Thou divine nature ! how thyself thou blazon'st
In these two princely boys ! they are as gentle
As zephyrs blowing below the violet,
Not wagging his sweet head ; and yet as rough
(Their royal blood in chaf'd) as the rud' st wind,
That by the top doth take the mountain-pine,
And make him stoop to th' vale.

Cymbeline, act 4. sc. 4.

" Why did not I pass away in secret, like the
" flower of the rock that lifts its fair head unseen,
" and throws its withered leaves on the blast ?"
Fingal.

As words convey but a faint and obscure notion of great numbers, a poet, to give a lively motion of the object he describes with regard to number, does well to compare it to what is familiar and commonly known. Thus Homer compares the Grecian army in point of number to a swarm of bees : in another passage he compares it to that profusion of leaves and flowers which appear in the spring, or of insects in a summer's evening : And Milton,

— — — As when the potent rod
Of Amram's son in Egypt's evil day
Wav'd round the coast, up call'd a pitchy cloud
Of locusts, warping on the eastern wind,
That o'er the realm of impious Pharaoh hung
Like night, and darken'd all the land of Nile ;
So numberless were those bad angels seen,
Hov'ring on wing under the cope of hell,
'Twixt upper, nether, and surrounding fires.

Paradise Lost, book 1.

Such comparisons have, by some writers, been condemned for the lowness of the images introduced : but surely without reason ; for, with regard to numbers, they put the principal subject in a strong light.

The foregoing comparisons operate by resemblance ; others have the same effect by contrast.

York. I am the last of noble Edward's sons,
Of whom thy father, prince of Wales, was first ;
In war, was never lion rag'd more fierce ;
In peace, was never gentle lamb more mild ;
Than was that young and princely gentleman.
His face thou hast, for even so look'd he,
Accomplish'd with the number of thy hours.

Compari-
son.

But when he frown'd, it was against the French,
And not against his friends. His noble hand
Did win what he did spend; and spent not that
Which his triumphant father's hand had won.
His hands were guilty of no kindred's blood,
But bloody with the enemies of his kin.
Oh Richard, York is too far gone with grief,
Or else he never would compare between.

Richard II. act. 2. sc. 3.

Milton has a peculiar talent in embellishing the principal subject, by associating it with others that are agreeable; which is the third end of a comparison. Similes of this kind have, beside, a separate effect: they diversify the narration by new images that are not strictly necessary to the comparison: they are short episodes, which without drawing us from the principal subject, afford great delight by their beauty and variety.

He scarce had ceas'd, when the superior fiend
Was moving toward the shore; his pond'rous shield,
Ethereal temper, massy, large, and round,
Behind him cast: the broad circumference
Hung on his shoulders like the moon, whose orb
Through optic glass the Tuscan artist views
At evening from the top of F-sole.
Or in Valdarno, to descry new lands,
Rivers, or mountains, in her spotty globe.

Milton, book 1.

—— Thus far these beyond
Compare of mortal prowess, yet observ'd
Their dread commander. He, above the rest,
In shape and stature proudly eminent,
Stood like a tow'r; his form had not yet lost
All her original brightness, nor appear'd
Less than archangel ruin'd, and th' excess
Of glory obscur'd: as when the sun new-risen
Looks through the horinzontal misty air
Shorn of his beams; or, from behind the moon
In dim eclipse, disastrous twilight sheds
On half the nations, and with fear of change
Preplexes monarchs.

Milton, book 1.

As when a vulture on Imaus bred,
Whose snowy ridge the roving Tartar bounds,
Dislodging from a region scarce of prey
To gorge the flesh of lambs, or yeanling kids,
On hills where flocks are fed, flies toward the springs
Of Ganges or Hydaspes, Indian streams,
But in his way lights on the barren plains
Of Sericana, where Chineses drive
With sails and wind their cany waggons light:
So on this windy sea of land, the fiend
Walk'd up and down alone, bent on his prey.

Milton, book 3.

Next of comparisons that aggrandise or elevate. These affect us more than any other sort: the reason of which will be evident from the following instances:

As when a flame the winding valley fills,
And runs on crackling shrubs between the hills,
Then o'er the stubble up the mountain flies,
Fires the high woods, and blazes to the skies,
This way and that, the spreading torrent roars;
So sweeps the hero through the wasted shores.

Around him wide, immense destruction pours,
And earth is delug'd with the sanguine show'rs.

Iliad, xx. 569.

Methinks, king Richard and myself should meet
With no less terror than the elements
Of fire and water, when their thund'ring shock,
At meeting, tears the cloudy cheeks of heav'n.

Richard II. act 3. sc. 5.

"As rusheth a foamy stream from the dark shady
"steep of Cromla, when thunder is rolling above,
"and dark brown night rests on the hill: so fierce,
"so vast, so terrible, rush forward the sons of Erin.
"The chief, like a whale of ocean followed by all
"its billows, pours valour forth as a stream, rolling
"its might along the shore."

Fingal, book 1.

"As roll a thousand waves to a rock, so Swa-
"ran's host came on; as meets a rock a thousand
"waves, so Inisfail met Swaran."

Ibid.

The last article mentioned, is that of lessening or depressing a hated or disagreeable object; which is effectually done by resembling it to any thing low or despicable.

Thus Milton, in his description of the rout of the rebel-angels, happily expresses their terror and dismay in the following simile:

—— As a herd
Of goats or timorous flock together throng'd
Drove them before him thunder-struck, pursu'd
With terrors and with furies to the bounds
And crystal wall of heav'n, which op'ning wide,
Roll'd inward, and a spacious gap disclos'd
Into the wasteful deep; the monstrous sight
Struck them with horror backward, but far worse
Urg'd them behind; headlong themselves they threw
Down from the verge of heav'n.

Milton, book 6.

By this time the different purposes of comparison, and the various impressions it makes on the mind, are sufficiently illustrated by proper examples. This was an easy work. It is more difficult to lay down rules about the propriety or impropriety of comparisons; in what circumstances they may be introduced, and in what circumstances they are out of place. It is evident that a comparison is not proper upon every occasion: a man in his cool and sedate moments, is not disposed to poetical flights, nor to sacrifice truth and reality to the delusive operations of the imagination: far less is he so disposed, when oppress'd with care, or interested in some important transaction that occupies him totally. On the other hand, it is observable, that a man, when elevated or animated by any passion, is disposed to elevate or animate all his subjects: he avoids familiar names, exalts objects by circumlocution and metaphor, and gives even life and voluntary action to inanimate beings. In this warmth of mind, the highest poetical flights are indulged, and the boldest similes and metaphors relished. But without soaring so high, the mind is frequently in a tone to relish chaste and moderate ornament; such as comparisons that set the principal object in a strong point of view, or that embellish and diversify the narration. In general, when by any animating passion, whether pleasant or painful, an impulse is given to the imagination;

Compari-
son.

nation; we are in that condition disposed to every sort of figurative expression, and in particular to comparisons. This in a great measure is evident from the comparisons already mentioned; and shall be further illustrated by other instances. Love, for example, in its infancy, rousing the imagination, prompts the heart to display itself in figurative language, and in similes:

Troilus. Tell me, Apollo, for thy Daphne's love,
What Cressid is, what Pandar, and what we?
Her bed is India, there she lies a pearl:
Between our Ilium, and where she resides,
Let it be call'd the wild and wandering flood;
Ourself the merchant, and this sailing Pandar
Our doubtful hope, our convoy, and our bark.

Troilus and Cressida, act. 1. sc. 1.

Again:

Come, gentle night; come, loving black-brow'd
night!
Give me my Romeo; and, when he shall die,
Take him and cut him out in little stars,
And he will make the face of heav'n so fine,
That all the world shall be in love with night,
And pay no worship to the garish sun.

Romeo and Juliet, act 3. sc. 4.

But it will be a better illustration of the present head, to give examples where comparisons are improperly introduced. Similes are not the language of a man in his ordinary state of mind, dispatching his daily and usual work: for that reason, the following speech of a gardener to his servant is extremely improper:

Go bind thou up yon dangling apricots,
Which, like unruly children, make their fire
Stoop with oppression of their prodigal weight:
Give some supportance to the bending twigs.
Go thou, and, like an executioner,
Cut off the heads of too fast growing sprays,
That look too lofty in our commonwealth:
All must be even in our government.

Richard II. act 3. sc. 7.

The fertility of Shakespeare's vein betrays him frequently into this error.

Rooted grief, deep anguish, terror, remorse, despair, and all the severe dispiriting passions, are declared enemies, perhaps not to figurative language in general, but undoubtedly to the pomp and solemnity of comparison. Upon this account, the simile pronounced by young Rutland, under terror of death from an inveterate enemy, and praying mercy, is unnatural;

So looks the pent-up lion o'er the wretch
That trembles under his devouring paws;
And so he walks insulting o'er his prey,
And so he comes to rend his limbs asunder.
Ah, gentle Clifford, kill me with thy sword
And not with such a cruel threat'ning look.

Third part Henry VI. act 1. sc. 5.

A man spent and dispirited after losing a battle, is not disposed to heighten or illustrate his discourse by similes.

York. With this we charg'd again; but out! alas,
We bodg'd again; as I have seen a swan
With bootless labour swim against the tide,
And spend her strength with over-matching waves.
Ah! hark, the fatal followers do pursue,

And I am faint and cannot fly their fury.
The sands are number'd that make up my life;
Here must I stay, and here my life must end.

Third part Henry VI. act 1. sc. 6.

Similes thus unseasonably introduced are finely ridiculed in the Rehearsal.

"*Bayes.* Now here she must make a simile.

"*Smith.* Where's the necessity of that, Mr Bayes?

"*Bayes.* Because she's surpris'd; that's a general rule; you must ever make a simile when you are surpris'd; 'tis a new way of writing."

A comparison is not always faultless, even where it is properly introduced. A comparison, like other human productions, may fall short of its end; of which defect instances are not rare even among good writers: and to complete the present subject, it will be necessary to make some observations upon such faulty comparisons. Nothing can be more erroneous than to institute a comparison too faint: a distant resemblance or contrast fatigues the mind with its obscurity, instead of amusing it; and tends not to fulfil any one end of a comparison. The following similes seem to labour under this defect.

K. Rich. Give me the crown.—Here, cousin,
seize the crown,

Here on this side, my hand; on that side, thine.
Now is this golden crown like a deep well,
That owes two buckets, filling one another;
The emptier ever dancing in the air,
The other down, unseen, and full of water;
That bucket down, and full of tears, am I,
Drinking my griefs, whilst you mount up on high.

Richard II. act 4. sc. 3.

K. John. Oh! cousin, thou art come to set mine
eye;

The tackle of my heart is crack'd and burnt;
And all the shrouds wherewith my life should sail,
Are turn'd to one thread, one little hair:
My heart hath one poor string to stay it by,
Which holds but till thy news be uttered.

King John, act 4. sc. 10.

York. My uncles both are slain in rescuing me:
And all my followers to the eager foe
Turn back, and fly like ships before the wind,
Or lambs pursu'd by hunger-starv'd wolves.

Third part Henry VI. act 1. sc. 6.

The latter of the two similes is good: the former, because of the faintness of the resemblance, produces no good effect, and crowds the narration with an useless image.

In an epic poem, or in any elevated subject, a writer ought to avoid raising a simile upon a low image, which never fails to bring down the principal subject. In general, it is a rule, that a grand object ought never to be resembled to one that is diminutive, however delicate the resemblance may be: for it is the peculiar character of a grand object to fix the attention, and swell the mind; in which state, it is disagreeable to contract the mind to a minute object, however elegant. The resembling an object to one that is greater, has, on the contrary, a good effect, by raising or swelling the mind: for one passes with satisfaction from a small to a great object; but cannot be drawn down, without reluctance, from great to small. Hence the following similes are faulty.

Meanwhile

Compari-
son.

Compari-
son.

Meanwhile the troops beneath Patroclus' care,
Invade the Trojans, and commence the war.
As wasps, provok'd by children in their play,
Pour from their mansions by the broad highway,
In swarms the guiltless traveller engage,
Whet all their stings, and call forth all their rage;
All rise in arms, and with a general cry
Assert their waxing domes and buzzing progeny:
Thus from the tents the fervent legion swarms,
So loud their clamours, and so keen their arms.

Iliad, xvi. 312.

So burns the vengeful hornet (soul all o'er)
Repuls'd in vain, and thirsty still of gore;
(Bold son of air and heat) on angry wings
Untam'd, untir'd, he turns, attacks, and stings.
Fin'd with like ardour, fierce Atrides flew,
And sent his soul with ev'ry lance he threw.

Iliad, xvii. 642.

An error opposite to the former, is the introducing a resembling image, so elevated or great as to bear no proportion to the principal subject. Their remarkable disparity, being the most striking circumstance, seizes the mind, and never fails to depress the principal subject by contrast, instead of raising it by resemblance: and if the disparity be exceeding great, the simile takes on an air of burlesque; nothing being more ridiculous than to force an object out of its proper rank in nature, by equalling it with one greatly superior or greatly inferior. This will be evident from the following comparison.

Loud as a bull makes hill and valley ring,
So roar'd the lock when it releas'd the spring.

Odysssey, xxi. 51.

Such a simile upon the simplest of all actions, that of opening a lock, is pure burlesque.

A writer of delicacy will avoid drawing his comparisons from any image that is nauseous, ugly, or remarkably disagreeable; for however strong the resemblance may be, more will be lost than gained by such comparison. Therefore we cannot help condemning, though with some reluctance, the following simile, or rather metaphor.

O thou fond many! with what loud applause
Didst thou beat heav'n with blessing Bolingbroke
Before he was what thou would'st have him be?
And now being trimm'd up in thine own desires,
Thou, beastly feeder, art so full of him,
That thou provok'st thyself to cast him up.
And so, thou common dog, didst thou disgorge
Thy glutton bosom of the royal Richard,
And now thou would'st eat thy dead vomit up,
And howl'st to find it.

Second Part Henry IV. act 1. sc. 6.

The strongest objection that can lie against a comparison is, that it consists in words only, not in sense. Such false coin, or bastard-wit, does extremely well in burlesque; but it is far below the dignity of the epic, or of any serious composition.

The noble sister of Poplicola,
The moon of Rome; chaste as the icicle
That's curdl'd by the frost from purest snow,
And hangs on Dian's temple.

Coriolanus, act 5. sc. 3.

There is evidently no resemblance between an icicle and a woman, chaste or unchaste: but chastity is cold

in a metaphorical sense, and an icicle is cold in a proper sense; and this verbal resemblance, in the hurry and glow of composing, has been thought a sufficient foundation for the simile. Such phantom similes are mere witticisms, which ought to have no quarter, except where purposely introduced to provoke laughter. Lucian, in his dissertation upon history, talking of a certain author, makes the following comparison, which is verbal merely.

"This author's descriptions are so cold, that they
surpass the Caspian snow, and all the ice of the
north."

—But for their spirits and souls
This word *rebellion* had froze them up
As fish are in a pond.

Second Part Henry IV. act 1. sc. 3.

Pope has several similes of the same stamp.

And hence one master passion in the breast,
Like Aaron's serpent, swallows up the rest.

Epist. 2. l. 131.

And again, talking of this same ruling or master passion;

Nature its mother, habit is its nurse;
Wit, spirit, faculties, but make it worse;
Reason itself but gives it edge and pow'r;
As heav'n's blest beam turns vinegar more sour.

Ibid. l. 145.

Where the subject is burlesque or ludicrous, such similes are far from being improper. Horace says pleasantly,

Quanquam tu levior cortice. *Lib.* 3. od. 9.

And Shakespeare,

In breaking oaths he's stronger than Hercules.

And this leads to observe, that besides the foregoing comparisons, which are all serious, there is a species, the end and purpose of which is to excite gaiety or mirth. Take the following examples:

Falstaff speaking to his page:

"I do here walk before thee, like a sow that
hath overwhelmed all her litter but one."

Second Part Henry IV. act 1. sc. 10.

"I think he is not a pick-purse, nor a horse-
stealer; but for his verity in love, I do think him
as concave as a covered goblet, or a worm-eaten
nut."

As you like it, act 3. sc. 10.

This sword a dagger had his page,
That was but little for his age;
And therefore waited on him so,
As dwarfs upon knights errant do.

Hudibras, canto 1.

"Books, like men, their authors, have but one
way of coming into the world; but there are
ten thousand to go out of it, and return no more."

Tale of a Tub.

"The most accomplished way of using books at
present is, to serve them as some do lords, learn
their titles, and then brag of their acquaintance."

Ibid.

"He does not consider, that sincerity in love is
as much out of fashion as sweet snuff; no body
takes it now."

Careless Husband.

COMPARTITION, in architecture, denotes the useful and graceful disposition of the whole ground-plot of an edifice, into rooms of office, and of reception or entertainment.

Compari-
son,
Compari-
tion.

Compartment,
Compass.

COMPARTMENT, in general, is a design composed of several different figures, disposed with symmetry, to adorn a parterre, a ceiling, &c.

A compartment of tiles or bricks, is an arrangement of them, of different colours, and varnished, for the decoration of a building. Compartments in gardening, are an assemblage of beds, plots, borders, walks, &c. disposed in the most advantageous manner that the ground will admit of. Compartments in heraldry, are otherwise called *partitions*.

COMPASS, or *Mariner's Steering COMPASS*, is an instrument used at sea by pilots to direct and ascertain the course of their ships. It consists of a circular brass box, which contains a paper card with the 32 points of the compass, fixed on a magnetic needle that always turns to the north, excepting a small declination variable at different places. See VARIATION.

The needle with the card turns on an upright pin fixed in the centre of the box. In the centre of the needle is fixed a brass conical socket or cap, whereby the card hanging on the pin turns freely round the centre.

The top of the box is covered with a glass, that the card's motion may not be disturbed by the wind. The whole is inclosed in another box of wood, where it is suspended by brass hoops or gimbals, to preserve the card horizontal. The compass-box is to be so placed in the ship, that the middle section of the box, parallel to its sides, may be parallel to the middle section of the ship along its keel.

The compass being of the utmost consequence to navigation, it is reasonable to expect that the greatest attention should be used in its construction, and every attempt to improve it carefully examined, and, if proper, adopted. But so careless are the generality of commanders of this most useful instrument, that almost all the compasses used on board merchant-ships have their needles formed of two pieces of steel-wire, each of which is bent in the middle, so as to form an obtuse angle; and their ends, being applied together, make an acute one; so that the whole represents the form of a lozenge; in the centre of which, and of the card, is placed the brass cap. Now, if we examine a number of these cards, we shall rarely, if ever, find them all in the same direction, but they will all vary more or less, not only with regard to the true direction, but from one another.

These irregularities are owing to the structure of the needle; for the wires of which it is composed are only hardened at the ends; now, if these ends are not equally hard, or if one end be hardened up higher than the other, when they come to be put together, in fixing them to the card, that end which is hardest will destroy much of the virtue of the other; by which means the hardest end will have the most power in directing the card, and consequently make it vary toward its own direction: and, as the wires are disposed in the form of a lozenge, these cards can have but little force, so that they will often, when drawn aside, stand at the distance of several degrees on either side the point from whence they are drawn: for all magnetical bodies receive an additional strength by being placed in the direction of the earth's magnetism, and act proportionably less vigorously when turned out of it; wherefore, when these kind of needles are drawn

aside from their true point, two of the parallel sides of the lozenge will conspire, more directly than before, with the earth's magnetism; and the other two will be less in that direction: by which means the two sides will very much impede its return; and the two latter will have that impediment to overcome, as well as the friction, by their own force alone.

To remove these inconveniences, some needles are made of one piece of steel of a spring temper, and broad towards the ends, but tapering towards the middle, where a hole is made to receive the cap. At the ends they terminate in an angle, greater or less according to the skill or fancy of the workman. These needles, though infinitely preferable to the other, are, however, far from being perfect; for every needle of this form hath six poles instead of two, one at each end, two where it becomes tapering, and two at the hole in the middle; this is owing to their shape; for the middle part being very slender, it has not substance enough to conduct the magnetic stream quite through, from one end to the other: all these poles appear very distinctly, when examined with a glass that is sprinkled over with magnetic sand. This circumstance, however, does not hinder the needle from pointing true; but as it has less force to move the card than when the magnetic stream moves in large curves from one end to the other, it is certainly an imperfection.

These inconveniences induced the ingenious Dr Knight to contrive a new sea-compass, which came into use on board all the ships of war. The needle in this instrument is quite straight, and square at the ends; and consequently has only two poles, though about the hole in the middle the curves are a little confused. Needles of this construction, after vibrating a long time, will always point exactly in the same direction; and if drawn ever so little on one side, will return to it again, without any sensible difference. We may therefore conclude, that a regular parallelopiped is the best form for a needle, as well as the simplest, the holes for the caps being as small as possible.

And as the weight should be removed to the greatest distance from the centre of motion, a circle of brass, of the same diameter of the card, may be added, which will serve also to support the card, which may then be made of thin paper, without any thing to stiffen it. This ring being fixed below the card, and the needle above it, the centre of gravity is placed low enough to admit of the cap being put under the needle, whereby the hole in the needle becomes unnecessary.

The above observations will be easily understood from viewing the several parts of the instrument as represented on Plate CXLIV. where fig. 6. is the card, with the needle KL, and its cap M, fixed upon it, being one-third of the diameter of the real card. Fig. 8. is a perspective view of the backside of the card, where AB represents the turning down of the brass edge, C the under part of the cap, D and E two sliding weights to balance the card, and F, G, two screws that fix the brass edge, &c. to the needle. Fig. 7. is the pedestal that supports the card, containing a screwing needle, fixed in two small grooves to receive it, by means

Compass. means of the collet C, in the manner of a port-crayon. D, the stem, is filed into an octagon, that it may be the more easily unscrewed. For its further illustration and application to use, see NAVIGATION.

The invention of the compass is usually ascribed to Flavio da Melfi, or Flavio Gioia, a Neapolitan, about the year 1302; and hence it is, that the territory of Principato, which makes part of the kingdom of Naples, where he was born, has a compass for its arms. Others say that Marcus Paulus, a Venetian, making a journey to China, brought back the invention with him in 1260. What confirms this conjecture is, that at first they used the compass in the same manner as the Chinese still do; *i. e.* they let it float on a little piece of cork, instead of suspending it on a pivot. It is added, that their emperor Chiningus, a celebrated astrologer, had a knowledge of it 1120 years before Christ. The Chinese only divide their compass into 24 points. Fauchette relates some verses of Guoyot de Provence, who lived in France about the year 1200, which seem to make mention of the compass under the name of *marinette*, or *mariner's stone*; which show it to have been used in France near 100 years before either the Melfite or Venetian. The French even lay claim to the invention, from the *fleur de lys* wherewith all nations shall distinguish the north point of the card. With as much reason Dr Wallis ascribes it to the English, from its name *compass*, by which name most nations call it, and which he observes is used in many parts of England to signify a circle.

Though the mariner's compass has been long in use, the best construction of it was attended with many inconveniences, till the late improvement which it has received from the invention and experiments of Dr Gowin Knight, and the farther emendation of Mr Smeaton, as has been described under the article AZIMUTH (Vol. II.)

The compass hath sometimes been observed to be disturbed by the electricity of its glass cover; and this from so slight an application of the finger as was barely necessary to wipe off a little dust. The same glass, rubbed a little more with the finger, a bit of muslin, or paper, would attract either end of the needle, so as to hold it to the glass for several minutes, far out of the due direction, according to that part of the glass which was most excited. And when the needle, after adhering to the glass, has dropped loose, and made vibrations, those would not be bisected as usual by that point where the needle should rest, but would either be made all on one side, or be very unequally divided, by means of some remains of electrical virtue in that part of the glass which had attracted the needle, until at length, after 15 minutes or more, all the electricity being discharged, the magnetical power took place. The remedy for this inconvenience is to moisten the surface of the glass; a wet finger will do it immediately and effectually. The mariner's compass with a chart is much less dangerously moved than the common compass with a bare needle: and the deeper, or farther distant, the needle hangs below the glass, the less disturbance it is likely to receive.

Notwithstanding the various contrivances that have been made to prevent the card from being much affected by the motions of the ship, they have always been found too delicate to encounter the shocks of a

tempestuous sea. Improved sea-compasses have lately been constructed by Mr M'Culloch of London (and for which he has obtained a patent), that are reported to be the best of any yet used. The particulars are as follow:

Fig. 1. is a section of the steering compass. *Aaaaa*, The common wooden-box, with its lid. *bb*, The brass compass-box. *cc*, The glass cover to ditto. *dd*, The hollow conical bottom. *e*, The prop upon which the compass is supported instead of gimbals; the spherical top of which is finely polished, and the apex of the hollow cone is fitted in a peculiar manner to receive it. *ff*, A quantity of lead run round the bottom and cone of the compass box, to balance and keep it steadily horizontal. *gg*, The card and the magnetical needle, bent in such a manner that the point of the conical pivot on which it moves and is supported, may be brought very near to the centre of gravity, as well as to the centre of motion. *hh*, Two guards, which by means of two pins *ii*, affixed to the compass box, prevents it from turning round and deceiving the steersman.

Fig. 2. a perspective view of the steering compass, with the lid off and the front laid open. *bb*, The guards. *b*, The compass-box. *e*, The prop, &c. as in fig. 1.

Fig. 3. a view of the azimuth compass. *b*, The compass-box. *b*, One of the guards. *e*, The prop, as in fig. 1. and 2. with this difference, that in the azimuth compass, instead of being screwed to the bottom of the wood-box, stands in a brass socket, and may be turned round at pleasure. 1. A brass bar, upon which the sight vanes are fixed. 2. A dark glass, which moves up or down on 3. the sight vane. 4. A magnifying glass, which is also moveable on the other vane. 5. The nonius or vernier. 6. A slide for moving the vernier so as to stop the card in taking the azimuth. 7. A double convex glass, by which the divisions on the vernier may be read with accuracy.

Fig. 4. is a section representing another application of the magnetic needle and card, constructed by Mr M'Culloch. *Aaaa*, The common wood-box. *bb*, The brass compass-box. *cc*, The brass support for the circle and pendulum. *d*, The pendulum. *e*, The agate. *ff*, The magnetic needle and card. *gg*, The brass circle. *hh*, The glass cover and brass ring. *i*, The lead weight. *N. B.* All the centres of motion are in the same plane.

"In one particular this patent compass is considered as an improvement on the common compasses, in as far as the needle is both longer and broader; hence its magnetism must be stronger, and of course the line of its magnetic direction correspondent with the card. In another particular, in order to prevent the motions of the vessel from affecting the needle, which is the most desirable object, the patent compass-box, instead of swinging in gimbals at right angles to each other, is supported in its very centre upon a prop; and whatever motion the other parts of the box may have, this centre being in the vertex of the hollow cone, may be considered as relatively at rest; and therefore gives little or no disturbance to the needle. Again, the pivot or centre upon which the needle turns, is so contrived as to stand always perpendicular over the centre of the compass-box, or apex of the hollow cone, as upon a fixed point; and is therefore still less affected

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by

Plate
CXLV.

Compass. by the motions of the vessel. Thus the centres of motion, gravity, and of magnetism, are brought almost all to the same point; the advantages of which will be readily perceived by any person acquainted with mechanical principles. Experience therefore will ascertain the utility of this improvement." *M^r Culloch's Account.*

Of Dr Knight's *Azimuth Compass*, as improved by Mr Smeaton, a description was given under the article *AZIMUTH*, and a figure in Plate LXXVII. The use of the azimuth compass is for finding the sun's magnetical azimuth, or amplitude; and thence the variation of the compass. If the observation be for an amplitude at sun-rising, or for an azimuth before noon, apply the centre of the index on the west point of the card, within the box; so that the four lines on the edge of the card, and those on the inside of the box, may meet. If the observation be for the sun's amplitude setting, or an azimuth in the afternoon, turn the centre of the index right against the east point of the card, and make the lines within the box concur with those on the card: the instrument thus fitted for observation, turn the index *bc* towards the sun, till the shadow of the thread *ae* fall directly on the slit of the sight, and on the line that is along the middle of the index: then will the inner edge of the index cut the degree and minute of the sun's magnetical azimuth from the north or south. But note, that if, when the compass is thus placed, the azimuth is less than 45° from the south, and the index turned towards the sun, it will pass off the divisions of the limb: the instrument therefore in this case must be turned just a quarter of the compass, *i. e.* the centre of the index must be placed on the north or south point of the card, according as the sun is from you; and then the edge will cut the degree of the magnetic azimuth, or the sun's azimuth from the north, as before.

The sun's magnetical amplitude thus found, the variation of the needle is thus determined. Being out at sea the 15th of May 1717, in 45° north latitude, the tables give me the sun's latitude 19° north, and his east amplitude $27^{\circ} 25'$ north: by the azimuth compass, I find the sun's magnetical amplitude at his rising and setting; and find he rises, *v. gr.* between the 62d and 63d degree, reckoning from the north towards the east point of the compass, *i. e.* between the 27th and 28th degree, reckoning from the east. The magnetical amplitude, therefore, being here equal to the true one, the needle has no variation; but if the sun at his rising should have appeared between the 52d and 53d degree from the north towards the east; his magnetical amplitude would then have been between 37 and 38 degrees, *i. e.* about ten degrees greater than the true amplitude: therefore the needle would vary about 10 degrees north-easterly. If the magnetical east amplitude found by the instrument should be less than the true amplitude, their difference would show the variation of the needle easterly. If the true east amplitude be southward, as also the magnetical amplitude, and this last be the greater; the variation of the needle will be north-west; and *vice versa*.

What has been said of north-east amplitudes holds also of south-west; and what of south-east amplitudes holds of north-west amplitudes. Lastly, if amplitudes be found of different denominations, *v. gr.* if

the true amplitude be six degrees north, and the magnetical amplitude be six degrees south; the variation, which in this case is north-west, will be equal to the sum of the magnetical and true amplitudes: understand the same for west amplitudes.

The variation may likewise be found from the azimuth: but in that case, the sun's declination, latitude of the place, and his altitude, must be given, that his true azimuth may be found.

This instrument is also useful in settling the ship's wake, in order to find the lee-way; and also to find the bearings of head-lands, and other objects.

COMPASS is also an instrument of considerable use in surveying land, dialing, &c.

Its structure, in the main, is the same with that of the mariner's compass; consisting, like that, of a box and needle: the principal difference consists in this, that instead of the needle's being fitted into the card, and playing with it on a pivot, it here plays alone; the card being drawn on the bottom of the box, and a circle divided in 360 degrees on the limb. See fig. 5. This instrument is of obvious use to travellers, to direct them in their road; and to miners, to show them what way to dig, with other considerable uses.

Plate
CXLIV.

1. *To take the declination of a wall by the Compass.* Apply that side of the compass whereon the north is marked along the side of the wall; the number of degrees over which the north end of the needle fixes will be the declination of the wall, and on that side; *v. gr.* if the north point of the needle tends towards the north, that wall may be shone on by the sun at noon; if it fix over fifty degrees, counting from the north towards the east, the declination is so many degrees from north towards east.

But since the needle itself declines from the north towards the west, with us, 13° ; it must be noted, that to retrieve the irregularity, 13° are always to be added to the degrees shown by the needle, when the declination of the wall is towards the east; on the contrary, when the declination is towards the west, the declination of the needle is to be subtracted.

2. *To take an angle with the Compass.* Suppose the angle required be DAE, fig. 4. apply that side of the compass whereon the north is marked to one of the lines AD; when the needle rests, observe the degrees at which its north point stands, which suppose 80° : so many degrees does the line decline from the meridian. In the same manner take the declination of the line AE, which suppose 215° ; subtract 80° from 215 , the remainder is 135 ; which subtracted from 180 , there will remain 45° ; the quantity of the angle required. But if the difference between the declination of the two lines exceed 180° ; in that case, 180° must be subtracted from that difference; the remainder then is the angle required.

In measuring angles by the compass, there needs not any regard be had to the variation; that being supposed the same in all the lines of the angles.

3. *To take a plot of a field by the Compass.* Suppose the field A, B, C, D, E, fig. 10. for the greater accuracy let there be two sights fitted to the meridian line of the compass, place it horizontal, and through the sights look along the side AB, or a line parallel to it; applying the eye to the sight at the south point of the compass. Draw a rough sketch of the field by the

Compass, the eye, and on the corresponding line enter down the degree to which the needle points, which suppose 90; measure the length of the side, and enter that too, which suppose 10 chains.

In this manner proceed with all the rest of the sides and angles of the field; the sides, which suppose 70, 65, 70, 44, 50 fathom; and the angles, which suppose 30, 100, 130, 240, 300, degrees. To protract the field, set down the several angles observed, one after another, and subtract the lesser from the next greater: thus will you have the quantity of the several angles, and the length of the lines that include them. For the rest, see GEOMETRY.

Note, All the angles of the figure taken together, must make twice as many right angles; abating two if no mistake has been committed.

Azimuth COMPASS. See AZIMUTH.

COMPASS-Dials, are small horizontal dials, fitted in brass or silver boxes, for the pocket, to show the hour of the day, by the direction of a needle that indicates how to place them right, by turning the dial about till the cock or style stand directly over the needle; but these can never be very exact, because of the variation of the needle itself. See COMPASS, and DIALING.

COMPASSES, or *Pair of COMPASSES*, a mathematical instrument for describing circles, measuring figures, &c.

The common compasses consist of two sharp-pointed branches or legs of iron, steel, brass, or other metal, joined together at the top by a rivet, whereon they move as on a centre. Those compasses are of the best sort in which the pin or axle on which the joint turns, and also half the joint itself, is made of steel, as the opposite metals wear more equable. The perfection of them may be known by the easy and uniform opening and shutting of their legs; one of which is sometimes made to take in and out, in order to make room for two other points to describe with ink, black-lead or other materials.

There are now used compasses of various kinds and contrivances, accommodated to the various uses they are intended for; as,

COMPASSES of three Legs, or *Triangular Compasses*, are, setting aside the excels of a leg, of the same structure with the common ones: their use being to take three points at once, and so to form triangles; to lay down three positions of a map, to be copied at once, &c.

Beam COMPASSES consist of a long branch, or beam, made of brass or wood, carrying two brass cursors, the one fixed at one end, the other sliding along the beam, with a screw to fasten it on occasion. To the cursors may be screwed points of any kind, whether steel for pencils, or the like. It is used to draw large circles, to take great extents, &c. To the fixed cursor is sometimes applied an adjusting or micrometer screw, by which an extent is obtained to extreme nicety. Mr Jones of Holborn has made beam compasses to adjust to the $\frac{1}{1000}$ th of an inch.

Caliber COMPASSES. See CALIBER.

Clockmaker's COMPASSES are joined like the common compasses, with a quadrant, or bow, like the spring compasses; only of different use, serving here to keep the instrument firm at any opening. They are made very strong, with the points of their legs of well tem-

pered steel, as being used to draw lines on paste-board or copper.

Cylindrical and Spherical COMPASSES, consist of four branches, joined in a centre, two of which are circular, and two flat, a little bent on the ends: their use is to take the diameter, thickness, or caliber of round or cylindric bodies; such as cannons, pipes, &c.

Elliptic COMPASSES. Their use is to draw ellipses, or ovals of any kind: they consist of a beam A B about a foot long, being three cursors; to one of which may be screwed points of any kind: to the bottom of the other two are riveted two sliding dove-tails, adjusted in grooves made in the cross branches of the beam. The dove-tails having a motion every way, by turning about the long branch, go backwards and forwards along the cross; so that when the beam has gone half-way about, one of these will have moved the whole length of one of the branches; and when the beam has got quite round, the same dove-tail has got back the whole length of the branch. Understand the same of the other dove-tail.

Note, the distance between the two sliding dove-tails is the distance between the two foci of the ellipse; so that by changing that distance, the ellipse will be rounded or slenderer. Under the ends of the branches of the cross are placed four steel points to keep it fast.

The use of this compass is easy; by turning round the long branch, the ink, pencil, or other point, will draw the ellipse required. Its figure shows both its use and construction.

German COMPASSES have their legs a little bent outwards, towards the top; so that when shut, the points only meet.

Hair COMPASSES are so contrived within side by a small adjusting screw to one of the legs, as to take an extent to a hair's breadth.

Lapidary's COMPASSES are a piece of wood, in form of the shaft of a plane, cleft at top, as far as half its length; with this they measure the angles, &c. of jewels and precious stones, as they cut them. There is in the cleft a little brass rule, fastened there at one end by a pin; but so that it may be moved in the manner of a brass level: with this kind of square they take the angles of the stones, laying them on the shaft as they cut them.

Proportional COMPASSES are those whose joint lies between the points terminating each leg: they are either simple or compound. In the former sort the centre is fixed, so that one pair of these serves only for one proportion.

Compound proportional COMPASSES consist of two parts or sides of brass, which lie upon each other so nicely as to appear but one when they are shut. These sides easily open, and move about a centre, which is itself moveable in a hollow canal cut through the greatest part of their length. To this centre on each side is affixed a sliding piece A of a small length, with a fine line drawn on it serving as an index, to be set against other lines or divisions placed upon the compasses on both sides. These lines are, 1. A line of lines. 2. A line of superficies, areas, or planes. 3. A line of solids. 4. A line of circles, or rather of polygons to be inscribed in circles. These lines are all unequally divided; the three first from 1 to 20, the last from 6 to 20. Their uses are as follow:

N n 2

By

Plate
CXLIV.
fig 9.

Plate
CXLV.
fig. 6.

Compasses.

By the line of lines you divide a given line into any number of equal parts; for by placing the index A against 1, and screwing it fast, if you open the compasses, then the distance between the points at each end will be equal. If you place the index against 2, and open the compasses, the distance between the points of the longer legs B B, will be twice the distance between the shorter ones C C; and thus a line is bisected, or divided into two equal parts. If the index be placed against 3, and the compasses opened, the distances between the points will be as 3 to 1, and so a line is divided into 3 equal parts; and so you proceed for any other number of parts under 10.

The numbers of the line of planes answer to the squares of those in the line of lines; for because superficies or planes are to each other as the squares of their like sides; therefore, if the index be placed against 2 in the line of planes, then the distance between the small points will be the side of a plane whose area is one; but the distance of the larger points will be the like side of a plane whose area is two; or twice as large. If the index be placed at 3, and the compasses opened, the distances between the points at each end will be the like side of planes whose area are as 1 to 3; and so of others.

The numbers of the line or solids answer to the cubes of those in the line of lines; because all solids are to each other as the cubes of their sides or diameters: therefore, if the index be placed to number 2, 3, 4, &c. in the line of solids, the distance between the lesser and larger points will be the like sides of solids, which are to each other as 1 to 2, 1 to 3, 1 to 4, &c. For example: If the index be placed at 10, and the compasses be opened so that the small points may take the diameter of a bullet whose weight is one ounce, the distance between the large points will be the diameter of a bullet or globe of 10 ounces, or which is 10 times as large.

Lastly, The numbers in the line or circles are the sides of polygons to be inscribed in a given circle, or by which a circle may be divided into the equal parts, from 6 to 20. Thus, if the index be placed at 6, the points of the compasses at either end, when opened to the radius of a given circle, will contain the side of a hexagon, or divide the circle into six equal parts. If the index be placed against 7, and the compasses opened so that the larger points may take in the radius of the circle, then the shorter points will divide the circle into seven equal parts for inscribing a heptagon. Again, placing the index to 8, and opening the compasses, the larger points will contain the radius, and the lesser points divide the circle into eight equal parts for inscribing an octagon or square. And thus you may proceed for others.

Proportional COMPASSES with the sector lines. The structure of these is so like that of the common proportional compasses, only a little nicer, that it needs no particular description. The lines on the first face are the line of lines, marked *lines*; it is divided into 100 equal parts, every tenth numbered: and the line of chords, which goes to 60° , is marked *chords*. On the other face are a line of sines to 90° , and a line of tangents to 45° . On one side are the tangents from 45° to $71^\circ 34'$; on the other, secants from 0° to $70^\circ 30'$.

Compasses.

For the use of these compasses: 1. To divide a line into any number of equal parts less than 100: divide 100 by the number of parts required; slip the cursor till the line on the sliding dove-tail be against the quotient on the line of lines: then, the whole line being taken between the points of the compasses most remote from the centre, the aperture of the other will show the division required. 2. A right line given, supposed to be divided into 100 parts, to take any number of those parts; slip the line on the sliding dove-tail to the number of parts required: the whole line being taken between the points farthest from the centre, the aperture of the other two will include the number of divisions required. 3. The radius being given, to find the chord of any arch under 60° ; slip the line on the sliding dove-tail to the degrees required on the line of chords: the radius being taken between the points farthest from the centre of the cursor; the aperture of the other line will be the chord required, provided the number of degrees be greater than 29° : if it be less, the aperture taken from the radius will leave the chord required. 4. If the chord of an arch under 60° be given, and the radius required; slip the line on the dove-tail to the degrees given on the line of chords: the given chord being taken between the two points next the cursor, the aperture of the other will be the radius required. 5. The radius being given, to find the sine of any number of degrees; slip the line on the dove-tail to the degree on the line of sines whose sine is required: the radius taken between the points furthest from the cursor, the aperture of the other will give the sine of the angle required. But if the sine sought be less than 30° , the difference of the apertures of the opposite points will be the sine required. 6. The radius being given, to find the tangent of any number of degrees under 71° : if the tangent required be under $26^\circ 30'$, then slip the line on the dove-tail to the degree proposed on the tangent line; the radius taken between the points farthest from the cursor, the aperture of the others will be the tangent of the degrees required: if the tangent required be above $26^\circ 30'$, but under 45° , the line on the cursor must be slipped to the degrees given on the tangent line: then the radius being taken between the points furthest from the cursor, the aperture of the others will be the tangent. If the tangent required be greater than 45° , but less than $56^\circ 20'$, slip the notch on the tangent side of the turned-check to the degree 0 in the tangent line on the side of the compass; the radius taken between the points farthest from the cursor; the difference between the aperture of the other and these, added together, will be the tangent required. Thus, for the tangents of the degrees under 71° . After the like manner may the secant of any number of degrees under 71° be found.

Mr Heath, a mathematical instrument-maker in London, constructed a pair of proportional compasses, in 1746, with a curious and useful contrivance for preventing the shorter legs from changing their position, when these compasses were used. It consisted of a small beam soldered to a screw, and running parallel to the leg of the compasses, nearly of the length of the groove; in this beam a slit was made, which admitted of a sliding-nut, the other end of which fell into a hole in the bottom of the screw, belonging to the great nut of

Compasses of the compasses. The screw-pin of the beam passed through an adjuster, by means of which the mark on the slider might be brought exactly to any division. But the proportional compasses have been much out of use since the invention of the sector.

Spring COMPASSES, or dividers; those with an arched head, which by its spring opens the legs; the opening being directed by a circular screw fastened to one of the legs, and let through the other, worked with a nut. These compasses are made of hardened steel.

Trifecting COMPASSES consist of two central rules, and an arch of circles of 120 degrees, immoveable, with its radius; which is fastened with one of the central rules like the two legs of a sector, that the central rule may be carried through all the points of the circumference or the arch. The radius and rule should be as thin as possible; and the rule fastened to the radius should be hammered cold, to attain the greater elasticity; and the breadth of the central rule should be triple that of the radius; there must also be a groove in this rule, with a dove-tail fastened on it for its motion, and a hole in the centre of each rule. The use of this instrument is to facilitate the trifecting of angles geometrically; and it is said to have been invented by M. Taragen for that purpose.

Turn-up COMPASSES. The body of this instrument is like the common compasses: but towards the bottom of the legs, without-side, are added two other points besides the usual ones: the one whereof carries a drawing pen point, and the other a port-crayon, both adjusted so as to turn round, and be in the way of use, or out of it, as occasion requires. These compasses have been contrived to save the trouble of changing the points.

COMPASSION, or **COMMISERATION**, in ethics, a mixed passion, compounded of love and sorrow, and excited by the sight or recital of distress. Hobbs makes this a merely selfish passion, and defines it, as being fear for ourselves; Hutcheson resolves it into instinct; but Dr Butler much more properly considers compassion as an original, distinct, particular affection in human nature.

COMPATIBLE, something that may suit or consist with another. See **INCOMPATIBLE**.

COMPEIGNE, a handsome town of the isle of France, in the county of Senlis, with a palace, or castle, where the king often resides. The maid of Orleans was taken prisoner here in 1430. It is seated on the river Oise, near a large forest. E. Long. 3. 12. N. Lat. 49. 25.

COMPENDIUM, in matters of literature, denotes much the same as epitome or abridgement. See **ABRIDGEMENT**.

COMPENSATION, in a general sense, an action whereby any thing is admitted as an equivalent to another.

COMPENSATION, in law. When the same person is debtor and creditor to another, the mutual obligations, if they are for equal sums, are extinguished by compensation; if for unequal, the lesser obligation is extinguished, and the greater diminished, as far as the concurrence of debt and credit goes.

COMPETENCE, or **COMPETENCY**, in a general sense, such a quantity of any thing as is sufficient.

COMPETENCY, in law, the right or authority of a judge, whereby he takes cognizance of any thing.

COMPETENTES, an order of catechumens, in the primitive Christian church, being the immediate candidates for baptism. See **CATECHUMEN**.

COMPETITION, in a general sense, is the same with rivalry, or when two or more persons contend for the same thing.

COMPETITION in Scots law. In escheats, see **LAW**, Part III. N^o clxvi. 17. &c. In confirmations by the superior, in resignations, and in personal rights of lands, *ibid.* clxviii. 5—9. In inhibitions, in adjudication, amongst assignees, arresters, and poinders, *ibid.* clxxi. 6. clxxii. 3. clxxvii. 2. clxxviii. 8, 9, 10. Amongst creditors of a defunct, clxxx. 19.

COMPITALIA, or **COMPITALITA**, feasts held among the ancients in honour of the *lares*. The word comes from the Latin *compitum*, a cross-way; by reason the feast was held in the meeting of several roads. The *compitalia* are more ancient than the building of Rome. Dionysius Halicarnassens, and Pliny, indeed, say, they were instituted by Servius Tullus; but this only signifies that they were then introduced into Rome. The feast being moveable, the day whereon it was to be observed was proclaimed every year. It was ordinarily held on the 4th of the nones of February, i. e. on the 2d of that month. Macrobius observes, that they were held not only in honour of the *lares*, but also of *mania*, madness. The priests who officiated at them were slaves and liberti, and the sacrifice a sow. They were re-established, after a long neglect, by Tarquin the Proud, on occasion of an answer of the oracle, that they should sacrifice heads for heads; i. e. that for the health and prosperity of each family, children were to be sacrificed: but Brutus, after expelling the kings, in lieu of those barbarous victims substituted the heads of garlic and poppy; thus satisfying the oracle which had enjoined *capita*, heads. During the celebration of this feast, each family placed at the door of their house the statue of the goddess *Mania*: they also hung up at their doors figures of wool, representing men and women; accompanying them with supplications that the *lares* and *mania* would be contented with those figures, and spare the people of the house.

COMPLEMENT, in geometry, is what remains of the quadrant of a circle, or 90°, after any certain arch has been taken away from it. Thus, if the arch taken away be 40°, its complement is 50; because 50 + 40 = 90. The sine of the complement of an arch is call the *co-sine*, and that of the tangent the *co-tangent*, &c.

COMPLETUS FLOS, in botany. A flower is said to be complete, which is provided with both the covers, viz. the calyx or flower-cup, and the petals. The term was invented by Vaillant, and is synonymous to *calyculatus flos* in Minnæus. Berkenhout erroneously confounds it with the *auctus* and *calyculatus calyx* of the same author.

COMPLEX, in a more general sense, a term synonymous with compound; though in strictness of speech there is some difference.

COMPLEX is properly applied where a thing contains divers others, or consists of divers parts not really distinct from each other, but only imaginarily, or in our

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Complex, our conceptions. In this sense the soul may be said to be complex, in respect of the understanding and will, which are two things that our reason alone distinguishes in it.

COMPLEX Term or Idea, is a term compounded of several simple or incomplex ones. This in the proposition, *A just God cannot leave crimes unpunished*; the subject of this proposition, viz. *a just God*, is a complex term, or stands for a complex idea composed of two simple or incomplex ones, viz. *God and just*.

COMPLEXION, among physicians, the temperament, habitude, and natural disposition, of the body; but more often the colour of the face and skin.

Few questions in philosophy have engaged the attention of naturalists more than the diversities among the human species, among which that of colour is the most remarkable. The great differences in this respect have given occasion to several authors to assert, that the whole human race have not sprung from one original; but that as many different species of men were at first created as there are now different colours to be found among them. Under the article **AMERICA**, n° 81—100. we have shown that all the arguments which can be brought for specific differences among mankind, whether drawn from a difference of colour, stature, or disposition, must necessarily be inconclusive. It remains, however, a matter of no small difficulty to account for the remarkable variations of colour that are to be found among different nations. On this subject Dr Hunter hath published a thesis, in which he considers the matter more accurately than hath commonly been done, and determines absolutely against any specific difference among mankind. He introduces his subject by observing, that when the question has been agitated, whether all the human race constituted only one species or not, much confusion has arisen from the sense in which the term *species* has been adopted. He therefore thinks it necessary to set out with a definition of the term. He includes under the same species all those animals which produce issue capable of propagating others resembling the original stock from whence they sprung. This definition he illustrates by having recourse to the human species as an example. And in this sense of the term he concludes, that all of them are to be considered as belonging to the same species. And as, in the case of plants, one species comprehends several varieties depending upon climate, soil, culture, and similar accidents; so he considers the diversities of the human race to be merely varieties of the same species, produced by natural causes. Of the different colours observable among mankind, he gives the following view:

BLACK. Africans under the line.

Inhabitants of New Guinea.

Inhabitants of New Holland.

SWARTHY. The Moors in the northern parts of Africa.

The Hottentots in the southern parts of it.

COPPER-COLOURED. The East Indians.

RED-COLOURED. The Americans.

BROWN-COLOURED. Tartars.

Persians.

Arabs.

BROWN-COLOURED. Africans on the coast of the Mediterranean. Chinese.

BROWNISH. The inhabitants of the southern parts of Europe; as

Sicilians,

Abyssinians,

Spaniards,

Turks, and likewise the Samoides and Laplanders.

WHITE. Most of the European nations; as

Swedes,

Danes,

English,

Germans,

Poles, &c.

Kabardinski,

Georgians,

Inhabitants of the islands in the Pacific Ocean.

In attempting to investigate the causes of these differences, our author observes, that there can be no dispute of the seat of colour being placed in the skin; that it is not even extended over the whole of this, but confined to that part named the cuticle, consisting of the epidermis and reticulum; and that it chiefly occupies the latter of these. The cuticle is much thicker and harder in black people than in white ones; the reticulum in the latter being a thin mucus, in the former a thick membrane. He concludes that this seat of colour in whites is transparent, and either totally deprived of vessels, or only furnished with very few; as the yellow colour appearing in jaundice vanishes on the cause of the disease being removed; which is not the case with stains in the cuticle from gunpowder, or similar causes. He next points out three causes destroying the pellucidity of the cuticle, giving it a brown colour, and rendering it thicker. These are, access of air, nastiness, and the heat of the sun. The influence of each of these he proves by many examples; and from these he is inclined to consider the last as by much the most powerful. If, however, it be admitted that these causes have this effect, he thinks that all the diversity of colour which is to be observed among mankind, may be thus accounted for. He remarks, that all the inhabitants of the torrid zone incline more or less to a black colour. When we observe the differences which occur among them, we must at the same time remember, that a black colour is not referred to heat alone, but to the other causes also: and when we attend to the diversity of temperature that occurs even in the torrid zone, the existence of a white nation there would by no means destroy the argument. He is farther of opinion, that the existence of a brown colour, and of considerable varieties from white, in the northern and coldest parts of Europe, may very easily be explained. This he accounts for from the manner of life of the inhabitants, by which they are either exposed to the inclemency of the air, or to constant nastiness from smoky houses.

Having thus attempted to account, from natural causes, for the varieties which occur among mankind with

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with respect to colour, our author observes, that, to all this reasoning, an objection will naturally be made, from considering that infants bring these marks into the world along with them, before they can be exposed to any such causes. Dr Hunter imagines, however, that this may readily be explained upon the supposition that many peculiarities acquired by parents are transmitted to their posterity; and of this, he thinks, no one can entertain the least doubt who attends to hereditary diseases. Thus, gout, scrophula, mania, and many other affections, although at first induced by particular accidents, will continue to affect families for many generations. In the same manner, a parent exposed to causes destroying the natural whiteness of his complexion, will beget swarthy children; and the same causes continuing to operate upon the son, the blackness will be increased. Thus all the different shades may have been at first induced, and afterwards continued.

The objection here obviated, however, might have been shortly answered by denying the fact; for it is now generally known, that the children of the blackest negroes are absolutely *born white*, as will be afterwards noticed.

This subject of complexion has been very well illustrated by Mr Clarkson, in a dissertation introduced in his Essay on the commerce and slavery of the human species. The first point that occurs to be ascertained, is, 'What part of the skin is the seat of colour?' The old anatomists usually divided the skin into two parts or laminæ; the exterior and thinnest, called by the Greeks *epidermis*, by the Romans *cuticula*, and hence by us *cuticle*; and the interior, called by the former *derma*, and by the latter *cutis*, or *true skin*. Hence they must necessarily have supposed, that, as the true skin was in every respect the same in all human subjects, however various their external hue, so the seat of colour must have existed in the cuticle or upper surface.

Malpighi, an eminent Italian physician of the last century, was the first person who discovered that the skin was divided into three laminæ or parts; the cuticle, the true skin, and a certain coagulated substance situated between both, which he distinguished by the title of *rete mucosum*: which coagulated substance adhered so firmly to the cuticle, as, in all former anatomical preparations, to have come off with it; and, from this circumstance, to have led the ancient anatomists to believe, that there were but two laminæ, or divisible portions in the human skin. See ANATOMY, n° 74—76.

This discovery was sufficient to ascertain the point in question: for it appeared afterwards that the cuticle, when divided according to this discovery from the other lamina, was semitransparent; that the cuticle of the blackest negro was of the same transparency and colour as that of the purest white; and hence the true skins of both being invariably the same, that the rete mucosum was the seat of colour.

This has been farther confirmed by all subsequent anatomical experiments; by which it appears, that, whatever is the colour of this intermediate coagulated substance, nearly the same is the apparent colour of the upper surface of the skin. Neither can it be otherwise; for the cuticle, from its transparency, must necessarily transmit the colour of the substance be-

neath it, in the same manner, though not in the same degree, as the cornea transmits the colour of the iris of the eye. This transparency is a matter of ocular demonstration in white people. It is conspicuous in every blush; for no one can imagine that the cuticle becomes red as often as this happens: nor is it less discoverable in the veins, which are so easy to be discerned; for no one can suppose that the blue streaks, which he constantly sees in the fairest complexions, are painted, as it were, on the surface of the upper skin. From these, and a variety of other observations, no maxim is more true in physiology, than that on the rete mucosum depends the colour of the human body; or, in other words, that the rete mucosum being of a different colour in different inhabitants of the globe, and appearing through the cuticle or upper surface of the skin, gives them that various appearance which strikes us so forcibly in contemplating the human race.

As this can be incontrovertibly ascertained, it is evident, that whatever causes co-operate in producing this different appearance, they produce it by acting upon the rete mucosum; which, from the almost incredible manner in which the cuticle is perforated, is as accessible as the cuticle itself. These causes are probably those various qualities of things, which, combined with the influence of the sun, contribute to form what we call *climate*. For when any person considers, that the mucous substance before mentioned is found to vary in its colour, as the climates vary from the equator to the poles, his mind must be instantly struck with the hypothesis, and he must adopt it without any hesitation, as the genuine cause of the phenomenon.

This fact, of the variation of the mucous substance, according to the situation of the place, has been clearly ascertained in the numerous anatomical experiments that have been made; in which subjects of all nations have come under consideration. The natives of many of the kingdoms and isles of Asia are found to have their rete mucosum black; those of Africa, situated near the line, of the same colour; those of the maritime parts of the same continent, of a dusky brown, nearly approaching to it; and the colour becomes lighter or darker in proportion as the distance from the equator is either greater or less. The Europeans are the fairest inhabitants of the world. Those situated in the most southern regions of Europe, have in their rete mucosum a tinge of the dark hue of their African neighbours: hence the epidemic complexion, prevalent among them, is nearly of the colour of the pickled Spanish olive; while in this country, and those situated nearer the north pole, it appears to be nearly, if not absolutely, white.

These are facts which anatomy has established; and we acknowledge them to be such, that we cannot divest ourselves of the idea, that climate has a considerable share in producing a difference of colour.

The only objection of any consequence that has ever been made to the hypothesis of climate, is this, that people under the same parallels are not exactly of the same colour. But this is no objection in fact; for it does not follow that those countries which are at an equal distance from the equator, should have their climates the same. Indeed nothing is more contrary to experience than this. Climate depends upon a va-

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riety of accidents. High mountains in the neighbourhood of a place make it cooler, by chilling the air that is carried over them by the winds. Large spreading succulent plants, if among the productions of the soil, have the same effect; they afford agreeable cooling shades, and a moist atmosphere from their continual exhalations, by which the ardour of the sun is considerably abated. While the soil, on the other hand, if of a sandy nature, retains the heat in an uncommon degree, and makes the summers considerably hotter than those which are found to exist in the same latitude where the soil is different. To this proximity of what may be termed *burning sands*, and to the sulphureous and metallic particles which are continually exhaling from the bowels of the earth, is ascribed the different degree of blackness by which some African nations are distinguishable from each other, though under the same parallels. To these observations we may add, that though the inhabitants of the same parallel are not exactly of the same hue, yet they differ only by shades of the same colour; or, to speak with more precision, that there are no two people, in such a situation, one of whom is white and the other black. To sum up the whole—Suppose we were to take a common globe; to begin at the equator; to paint every country along the meridian line in succession from thence to the poles; and to paint them with the same colour which prevails in the respective inhabitants of each, we should see the black, with which we had been obliged to begin, insensibly changing to an olive, and the olive, through as many intermediate colours, to a white: and if, on the other hand, we should complete any one of the parallels according to the same plan, we should see a difference perhaps in the appearance of some of the countries through which it ran, though the difference would consist wholly in shades of the same colour.

The argument, therefore, which is brought against the hypothesis, is so far from being an objection, that it may be considered as one of the first arguments in its favour: for if climate has really an influence on the mucous substance of the body, it is evident, that we must not only expect to see a gradation of colour in the inhabitants from the equator to the poles, but also different shades of the same colour in the inhabitants of the same parallel.

To this argument may be added one that is uncontrovertible, which is, that when the black inhabitants of Africa are transplanted to colder, or the white inhabitants of Europe to hotter climates, their children, born there, are of a different colour from themselves; that is, lighter in the first, and darker in the second instance.

As a proof of the first, we shall give the words of the Abbé Raynal, in his admired publication. "The children," says he, "which they (the Africans) procreate in America, are not so black as their parents were. After each generation the difference becomes more palpable. It is possible, that after a numerous succession of generations, the men come from Africa would not be distinguished from those of the country into which they may have been transplanted."

This circumstance we have had the pleasure of hearing confirmed by a variety of persons who have been witnesses of the fact; but particularly by many intel-

ligent Africans, who have been parents themselves in America, and who have declared, that the difference is so palpable in the northern provinces, that not only they themselves have constantly observed it, but that they have heard it observed by others.

Neither is this variation in the children from the colour of their parents improbable. The children of the blackest Africans are born white. In this state they continue for about a month, when they change to a pale yellow. In process of time they become brown. Their skin still continues to increase in darkness with their age, till it becomes of a dirty fallow black: and at length, after a certain period of years, glossy and shining. Now, if climate has any influence on the mucous substance of the body, this variation in the children from the colour of their parents is an event which must be reasonably expected: for being born white, and not having equally powerful causes to act upon them in colder, as their parents had in the hotter climates which they left, it must necessarily follow, that the same effect cannot possibly be produced.

Hence also, if the hypothesis be admitted, may be deduced the reason why even those children who have been brought from their country at an early age into colder regions, have been observed to be of a lighter colour than those who have remained at home till they arrived at a state of manhood. For having undergone some of the changes which we mentioned to have attended their countrymen from infancy to a certain age, and having been taken away before the rest could be completed, these farther changes, which would have taken place had they remained at home, seem either to have been checked in their progress, or weakened in their degree, by a colder climate.

We come now to the second and opposite case; for a proof of which we shall appeal to the words of Dr Mitchell in the *Philosophical Transactions*, n^o 476. sect. 4. "The Spaniards who have inhabited America under the torrid zone for any time, are become as dark coloured as our native Indians of Virginia, of which I myself have been a witness; and were they not to intermarry with the Europeans, but lead the same rude and barbarous lives with the Indians, it is very probable, that, in a succession of many generations, they would become as dark in complexion."

To this instance we shall add one, which is mentioned by a late writer, who, describing the African coast and the European settlements there, has the following passage. "There are several other small Portuguese settlements, and one of some note at Mitomba, a river in Sierra Leon. The people here called *Portuguese*, are principally persons bred from a mixture of the first Portuguese discoverers with the natives, and now become, in their complexion and woolly quality of their hair, perfect negroes, retaining, however, a smattering of the Portuguese language."

These facts with respect to the colonists of the Europeans are of the highest importance in the present case, and deserve a serious attention. For when we know to a certainty from whom they are descended; when we know that they were, at the time of their transplantation, of the same colour as those from whom they severally sprung; and when, on the other hand, we are credibly informed that they have changed it for the native colour of the place which they now inhabit

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the evidence in support of these facts is as great as if a person, on the removal of two or three families into another climate, had determined to ascertain the circumstance; as if he had gone with them and watched their children; as if he had communicated his observations at his death to a successor; as if his successor had prosecuted the plan: and thus an uninterrupted chain of evidence had been kept up from their first removal to any determined period of succeeding time.

But though these facts seem sufficient of themselves to confirm our opinion, they are not the only facts which can be adduced in its support. It can be shown, that the members of the very same family, when divided from each other, and removed into different countries, have not only changed their family complexion, but that they have changed it to as many different colours as they have gone into different regions of the world. We cannot have, perhaps, a more striking instance of this than in the Jews. These people are scattered over the face of the whole earth. They have preserved themselves distinct from the rest of the world by their religion; and as they never intermarry with any but those of their own sect, so they have no mixture of blood in their veins that they should differ from each other: and yet nothing is more true, than that the English Jew is white, the Portuguese swarthy, the Armenian olive, and the Arabian copper; in short, that there appear to be as many different species of Jews as there are countries in which they reside.

To these facts we shall add the following observation, that if we can give credit to the ancient historians in general, a change from the darkest black to the purest white must have actually been accomplished. One instance, perhaps, may be thought sufficient. Herodotus relates, that the Colchi were black, and that they had crisped hair. These people were a detachment of the Æthiopian army under Sesostris, who followed him in his expedition, and settled in that part of the world where Colchis is usually represented to have been situated. Had not the same author informed us of this circumstance, we should have thought it strange that a people of this description should have been found in such a latitude. Now as they were undoubtedly settled there, and as they were neither so totally destroyed, nor made any such rapid conquests, as that history should notice the event, there is great reason to presume that their descendants continued in the same, or settled in the adjacent country; from whence it will follow, that they must have changed their complexion to that which is observed in the inhabitants of this particular region at the present day; or, in other words, that the black inhabitants of Colchis must have been changed into the fair Circassian. Suppose, without the knowledge of any historian, they had made such considerable conquests as to have settled themselves at the distance of 1000 miles in any one direction from Colchis, still they must have changed their colour: For had they gone in an eastern or western direction, they must have been of the same colour as the Circassians; if to the north, whiter; if to the south, of a copper. There are no people within that distance of Colchis who are black.

From the whole of the preceding observations on the subject, we may conclude, that as all the inhabitants of the earth cannot be otherwise than

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the children of the same parents, and as the difference of their appearance must have of course proceeded from incidental causes, these causes are a combination of those qualities which we call *climate*: that the blackness of the Africans is so far engrafted in their constitution, in a course of many generations, that their children wholly inherit it if brought up in the same spot; but that it is not so wholly interwoven in their nature, that it cannot be removed if they are born and settled in another.

The same principles with the above we find adopted and further illustrated by Professor Zimmerman of Brunswick, in his celebrated work *The Geographical History of Man*, &c. He there proves in the most satisfactory manner, That the complexion of the human species is uniformly correspondent with the degree of heat or cold to which they are habitually exposed. In maintaining this position, he makes a very proper distinction with regard to climate. By *climates* we are to understand, not simply or solely those distinguished by the geographical divisions of the globe, to the exclusion of what he terms *physical climate*, or that which depends on the changes produced in any given latitude by such adventitious circumstances as the lower or more elevated situations of a country, its being encompassed by water or large tracts of land, overspread or surrounded with forests, placed in an extensive plain, or environed by lofty mountains. Peculiarities of the like kind, as has been already noticed, frequently prevent the *physical climate* from corresponding entirely with the *geographical*, as a country influenced by them is often much warmer or colder than other regions placed under the same degree of latitude. The influence of these secondary or modifying circumstances has been already adverted to, and need not be further enlarged upon: we shall here only observe, that the erroneous reasoning of Lord Kames on this subject seems to have been owing to this inattention to the difference above mentioned. At Senegal, and in the adjacent lands, the thermometer is often at 112 or 117 degrees in the shade; and here we find the inhabitants jet black, with woolly hair. The heat is equally great in Congo and Loango, and these countries are inhabited by negroes only; whereas in Morocco, to the north of these regions, and at the Cape of Good Hope, to the south, the heat is not so intense, nor are the inhabitants of so deep a hue. Lord Kames asks, Wherefore are not the Abyssinians and the inhabitants of Zaara of as dark a complexion as the Moors on the coast of Guinea? M. Zimmerman answers, that "these countries are much cooler. The desert is not only farther from the equator, but the winds blowing over the Atlas mountains, which like the Alps are covered with snow, and the westerly wind coming from the sea, must considerably mitigate the heat. Nor is Abyssinia so warm as either Monomotopa or Guinea. The north-east winds from the side of Persia and Arabia are cooled by their passage over the Red Sea: the northern winds from Egypt lose much of their heat on the chain of mountains that is extended between the countries: the winds from the south and the west are sea-winds. Thus the only quarter from which they can derive excessive heat is from the west, as the air on this side must pass over tracts of heated lands." For a similar reason it is that negroes are not found either in Asia or South A-

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merica under the equator. The situations of these countries, our author observes, expose them to sea-breezes and cooling winds from the continent. He confirms this hypothesis by observing, that the mountaineers of warm climates, as in Barbary and Ceylon, are much fairer than the inhabitants of the valleys: that the Saracens and Moors, who conquered the north-east part of Africa in 1700, from being brown, are become like the negroes near the equator: that the Portuguese, who settled at Senegal in 1400, became blacks; and Tudela the Jew asserts, that his countrymen in Abyssinia acquired the dark complexion of the original natives.

Upon the whole: Colour and figure may be styled habits of the body. Like other habits, they are created, not by great and sudden impressions, but by continual and almost imperceptible touches. Of habits both of mind and body, nations are susceptible as well as individuals. They are transmitted to offspring, and augmented by inheritance. Long in growing to maturity, national features, like national manners, become fixed only after a succession of ages. They become, however, fixed at last; and if we can ascertain any effect produced by a given state of weather or of climate, it requires only repetition during a sufficient length of time to augment and impress it with a permanent character. The sanguine countenance will, for this reason, be perpetual in the highest latitudes of the temperate zone; and we shall for ever find the swarthy, the olive, the tawny, and the black, as we descend to the south.

The uniformity of the effect in the same climate, and on men in a similar state of society, proves the power and certainty of the cause. If the advocates of different human species suppose that the beneficent Deity hath created the inhabitants of the earth of different colours, because these colours are best adapted to their respective zones; it surely places his benevolence in a more advantageous light to say, he has given to human nature the power of accommodating itself to every zone. This pliancy of nature is favourable to the unions of the most distant nations, and facilitates the acquisition and the extension of science, which would otherwise be confined to few objects and to a very limited range. It opens the way particularly to the knowledge of the globe which we inhabit; a subject so important and interesting to man. It is verified by experience. Mankind are for ever changing their habitations by conquests or by commerce; and we find them in all climates, not only able to endure the change, but so assimilated by time, that we cannot say with certainty whose ancestor was the native of the clime, and whose the intruding foreigner.

All the foregoing observations have been well recapitulated, illustrated by new facts, and enforced by additional reasoning founded on experience, by the Reverend Dr S. S. Smith, professor of moral philosophy in the college of New Jersey, in his *Essay on the Causes of the Variety of Complexion and Figure in the Human Species*; to which the reader who wishes for further satisfaction on the subject is referred.

COMPLEXUS; and *COMPLEXUS Minor*, or *Trabeculo-mastoidæus*: two muscles in the posterior part of the trunk. See ANATOMY, *Table of the Muscles*.

COMPLICATION, in general, denotes the blend-

ing, or rather interweaving, of several different things together: thus, a person afflicted with several disorders at the same time, is said to labour under a complication of disorders.

COMPLINE, the last division of the Romish breviary. It was instituted to implore God's protection during the night, as the *prime* is for the day. It is recited after sun-set; and is so called, because it completes the office for the 24 hours.

COMPLUTENSIAN BIBLE. See BIBLE (*Greek*).

COMPONE, or COMPONED, or *Gobony*, in heraldry. A bordure compone is that formed or composed of a row of angular parts, or chequers of two colours.

COMPONED, or COMPOSED, is also used in general for a bordure, a pale, or a fess, composed of two different colours or metals disposed alternately, separated and divided by fillets, excepting at the corners; where the junctures are made in form of a goat's foot.

COMPOSITE, in general, denotes something compounded, or made up of several others united together: thus,

COMPOSITE Numbers, are such as can be measured exactly by a number exceeding unity; as 6 by 2 or 3, or 10 by 5, &c. so that 4 is the lowest composite number. Composite numbers, between themselves, are those which have some common measure besides unity; as 12 and 15, as being both measured by 3.

COMPOSITE Order, in architecture, the last of the five orders of columns; so called because its capital is composed out of those of the other columns, borrowing a quarter round from the Tuscan and Doric, a row of leaves from the Corinthian, and volutes from the Ionic. Its cornice has simple modillions or dentils. It is also called the *Roman* or *Italic* order, as having been invented by the Romans. By most authors it is ranked after the Corinthian, either as being the next richest, or the last invented. See ARCHITECTURE, n° 48.

COMPOSITION, in a general sense, the uniting or putting together several things, so as to form one whole, called a *compound*.

COMPOSITION of Ideas, an act of the mind, whereby it unites several simple ideas into one conception or complex idea.

When we are provided with a sufficient stock of simple ideas, and have by habit and use rendered them familiar to our minds, they become the component parts of other ideas still more complicated, and form what we may call a second order of compound notions. This process may be continued to any degree of composition we please, mounting from one stage to another, and enlarging the number of combinations.

COMPOSITION, in grammar, the joining of two words together; or prefixing a particle to another word, to augment, diminish, or change its signification.

COMPOSITION, in logic, a method of reasoning, whereby we proceed from some general self-evident truth to other particular and singular ones.

In disposing and putting together our thoughts, there are two ways of proceeding equally within our choice: for we may so suppose the truths, relating to any part of knowledge, as they presented themselves to the mind in the manner of investigation; carrying on the series of proofs in a reverse order, till they at last terminate

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minute in first principles: or beginning with these principles, we may take the contrary way; and from them deduce, by a direct train of reasoning, all the several propositions we want to establish.

This diversity in the manner of arranging our thoughts gives rise to the twofold division of method established among logicians; the one called *analytic* method, or the method of *resolution*, inasmuch as it traces things back to their source, and resolves knowledge into its first and original principles. This method stands in contradistinction to the method of composition; or, as it is otherwise called, the *synthetic* method: for here we proceed by gathering together the several scattered parts of knowledge, and combining them into one system, in such a manner as that the understanding is enabled distinctly to follow truth through all the different stages of gradation.

COMPOSITION, in music, is the art of inventing and writing airs; of accompanying them with a suitable harmony; in short, of forming a complete piece of music in all its parts.

The knowledge of melody, harmony, and its rules, is the foundation of composition. Without doubt, it is necessary to know in what manner chords should be filled, how to prepare and resolve dissonances, how to find the fundamental bass, and how to put in practice all the other minutiae of elementary knowledge; but with the mechanical rules of harmony alone, one is by no means better qualified to understand the art, and operate in the practice of composition, than to form himself for eloquence upon all the rhetorical precepts exhibited in grammar. We need not say, that besides this, it is necessary to understand the genius and compass of voices and instruments; to judge what airs may be of easy, and what of difficult, execution; to observe what will, and what will not, be productive of any effect; to feel the character of different movements, as well as that of different modulations, that both may be always suitably applied; to know the different rules established by convention, by taste, by caprice, or by pedantry, as fugues, imitations, or in pieces where the subject is confined to uniform laws in its harmony, melody, rhythmus, &c. All these acquisitions are still no more than preparatives for composition: but the composer must find in his own genius the sources of beautiful melody, of sublime harmony, the picturesque, and the expressive in music; he must, in short, be capable of perceiving, and of forming, the order of the whole piece; to follow the relations and aptitudes of which it is susceptible in every kind; to inflame his soul with the spirit and enthusiasm of the poet, rather than childishly amuse himself with punning in harmony, or adapting the music to each particular word. It is with reason that our musicians have given the name of *words* to the poems which they set to music. It appears evident from their manner of expressing them, that, in their apprehension, they seemed words, and words alone. One would be tempted to imagine, particularly during some of these last years, that the rules for the formation and succession of chords have caused all the rest to be neglected or forgot; and that harmony has made no acquisitions but at the expence of what is general and essential in the musical art. All our artists know how to fill a chord with its constituent sounds, or a piece of

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harmony with its constituent parts; but not a soul amongst them feels a ray of composition. As to what remains, though the fundamental rules of counterpoint, or music in parts, continue still the same, they are more or less rigorous and inflexible in proportion as the parts increase in number; for according as the parts are multiplied, the difficulty of composition is heightened, and the rules are less severe.—Compositions in two parts are called *duettos* when the two performers sing equally; that is to say, when the subject is no further extended, but divided between them: but if the subject is in one part alone, and the subordinate harmony no more than an accompaniment, the first part is then either called a *recitative* or a *solo*; and the other an *accompaniment*, or *continued bass*, if it is a bass. It is the same case with the *trio*, with compositions in three, in four, or in five parts.

The name of *composition* is likewise given to such pieces of music themselves as are formed according to the rules of the art. For this reason the *duetts*, *trios*, *quartettos*, which have just been mentioned, are called *compositions*.

Compositions are either formed for the voice alone, or for instruments, or for voices and instruments joined. Full choruses and songs are the only compositions principally intended for the voice, though sometimes instruments are joined with it to support it. Compositions for instruments are intended to be executed by a band in the orchestra, and then they are called *symphonies*, *concertos*; or for some particular species of instruments, and then they are called *pieces* or *sonatas*.

Such compositions as are destined both for voices and instruments, have been generally divided into two capital species, *viz.* the *sacred* and the *secular*. The compositions destined for the church, whether psalms, hymns, anthems, or responsives, are in general distinguished by the name of *church-music*, and characterised by their intention to be sung with words. Secular music in general may likewise be divided into two kinds; *theatrical* and *chamber music*. Of the first kind is that used in the operas; the subdivisions of the second are endless. Solos, concertos, cantatas, songs, and airs, almost of every kind, which are not adapted to the church or the stage, may be included in the idea of *chamber-music*.

In general, it is thought, that sacred music requires deeper science, and a more accurate observation of rules; the secular species gives more indulgence to genius, and subsists in greater variety.

But we must here observe, that the ecclesiastical music now used, or rather profaned and murdered, amongst us, though regular in its harmony, is simple in its composition, and demands not that profound knowledge in the art, either to form or comprehend it, which Rousseau, whom till now we have followed in this article, seems to imagine. His assertion can only be applicable to the church-music of Italy. That which is now established amongst us seems not to be indigenous, but transferred with the Calvinistical liturgy from Geneva; and as it is intended for popular use, it can by no means be esteemed an high exertion of the musical art: yet, however simple, it is pleasing; and, when properly performed, might elevate the soul to a degree of devotion, and even of rapture, which

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at present we are so far from feeling, that we rather seem to sleep or to howl, than to sing the praise of God. Perhaps our clergy may find more advantage in cultivating their farms; but they would surely feel a higher and diviner pleasure in cultivating the tastes and voices of their people. The one, however, is not incompatible with the other. An hour of relaxation in a winter evening might serve for the accomplishment of this pious purpose; and one should imagine, that, independent of religious considerations, the spirit of the craft might dictate such a measure as calculated to produce popular entertainment and gain popular affection.

In composition, the author either confines himself, as a subject, to the mere mechanical modulations and arrangements of sound; and, as his end, to the pleasure of the ear alone; or otherwise he soars a nobler height; he aspires to imitative music; he endeavours to render the hearts and souls of his auditors ductile by his art, and thus to produce the noblest emotions and most salutary effects. In the first view, it is only necessary that he should look for beautiful sounds and agreeable chords; but in the second he ought to consider music in its conformity with the accents of the human voice, and in the expressive powers of notes harmonically combined to signify or paint such objects as are susceptible of imitation. In Rousseau's article *Opera*, some ideas may be found by which the art may be ennobled and elevated, by forming music into a language more powerful and pathetic than eloquence itself. See *OPERA*.

COMPOSITION, in literature, the art of forming and arranging sentiments, and clothing them with language suitable to the nature of the subject or discourse. See the articles *LANGUAGE*, *ORATORY*, *POETRY*, *DIALOGUE*, *EPISTLE*, and *HISTORY*.

COMPOSITION, in chemistry, is the union and combination of several substances of different natures, from which a compound body results. From this union of bodies of different natures, a body is formed, of a mixed nature, which Becker and Stahl have called a *mixture*, and which may be called a *combination*, or *chemical composition*, to avoid the equivocal sense of the word *mixture*. By this last, we understand only a mere apposition of parts; and which would therefore give a very false idea of chemical composition, in which a mutual adhesion takes place between the combined substances.

COMPOSITION, in painting, includes the invention as well as disposition of the figures, the choice of attitudes, &c.

Composition, therefore, consists of two parts; one of which finds out, by means of history, proper objects for a picture; and the other disposes them to advantage. See *PAINTING*.

COMPOSITION, in pharmacy, the art or act of mixing divers ingredients together into a medicine so as they may assist each other's virtues, supply each other's defects, or correct any ill qualities thereof. See *PHARMACY*.

COMPOSITION, in commerce, a contract between an insolvent debtor and his creditors, whereby the latter accept of a part of the debt in composition for the whole, and give a general acquittance accordingly.

COMPOSITION, in printing, commonly termed *compositing*, the arranging of several types or letters in the composing-stick, in order to form a line; and of several lines ranged in order, in the galley, to make a page; and of several pages to make a form. See *PRINTING*.

COMPOSITÆ, in botany. The name of a class in Hermannus and Royen; as likewise of an order in Linnæus's fragments of a natural method, consisting in general of the plants which have the characters enumerated in the following article. A particular description of this order is given under the article *SYNGENESIA*, which includes all the compound flowers.

COMPOSITUS FLOS, in botany, an aggregate flower composed of many *flosculi sessiles*, on a common entire receptaculum, with a common perianthium, and whose antheræ being five in number unite in the form of a cylinder; the flosculi are monopetalous, and under each of them is a monospermous germen. Compound flowers are either *ligulati*, *tubulosi*, or *radiati*.

COMPOST, in agriculture, denotes a certain kind of mixture designed to assist the soil in the way of vegetation, instead of dung. The requisites for a compost are, 1. That it ought to be cheaper than the quantity of dung required for an equal extent of soil. 2. It ought to be less bulky; and, 3. It ought to produce equal effects.

Under the article *AGRICULTURE*, we have endeavoured to show, that the true vegetable food consists in reality of the putrid effluvia proceeding from decayed animal and vegetable substances. If this theory is admitted, the hope of making composts as a succedaneum for dung is but very small, unless they are made of putrefied animal and vegetable substances; in which case, unless in very singular circumstances, they will prove much dearer than dung itself. Several attempts, however, have been made by those who had other views concerning the nature of the true vegetable food. An oil-compost is recommended in the *Georgical Essays*, upon a supposition that the food of vegetables is of an oily nature. It is made as follows: "Take of North American potash 12 lb. Break the salt into small pieces, and put it into a convenient vessel with four gallons of water. Let the mixture stand 48 hours: then add coarse train oil 14 gallons. In a few days the salt will be dissolved, and the mixture, upon stirring, will become nearly uniform. Take 14 bushels of sand, or 20 of dry mold; upon these pour the above liquid ingredients. Turn this composition frequently over, and in six months it will be fit for use. When the liquid ingredients are put to one or two hogheads water, a liquid compost will be formed, which must be used with a water cart."

This compost, however, the inventor himself owns to be inferior to rotten dung, as indeed may very naturally be supposed; yet in some cases it seems capable of doing service, as will appear from some of the following experiments which we extract from the essays above mentioned.

Exp. I. By the author of the essays. "I took four pots, n^o 1, 2, 3, 4. N^o 1. contained 12lb. of barren sand, with 1 oz. of the sand oil compost. N^o 2. contained 12lb. of sand without any mixture. N^o 3. had 12lb. of sand with half an ounce of slaked lime. N^o 4.

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Compost. had 12 lb. of sand with 4 oz. of the sand oil-compost. In the month of March, I put six grains of wheat into each pot, and during the summer, I occasionally watered the plants with filtrated water. All the time the plants were consuming the farina, I could observe very little difference in their appearance. But after one month's growth, I remarked that n° 1. was the best; n° 2. the next; n° 3. the next; and n° 4. much the worst." The same differences were observed in August, when n° 1. the best, had five small ears, which contained a few poor grains of wheat.

Exp. II. By the same. "In the month of June, I selected four lands of equal goodness in a field intended for turnips. The soil was a light sand, with a tolerable quantity of vegetable earth amongst it. It was ploughed out of sward in November, and had not borne a crop for many years. I shall distinguish my experimental lands by n° 1, 2, 3, 4. N° 1. was manured with rotten dung; n° 2 with oil-compost; n° 3. with lime; n° 4. was left without any dressing. On the 20th of June they were all sown with turnip-seed broadcast, and during the course of the season were twice hoed. In November I viewed the field, and made the following remarks. N° 1. the best; n° 2. the next; n° 3. the worst; n° 4. better than n° 3." Here the oil-compost appears in a favourable light; but other trials, made with equal accuracy, seem rather to prove, that it is not proper for turnips, barley, or quick growing vegetables. It requires being meliorated by the atmosphere, and therefore is better adapted for winter-crops.

Exp. III. by the same. "In the month of May, I planted 12 alleys that lay between my asparagus beds with cauliflower plants. Each alley took up about 30 plants. One of the alleys I set apart for an experiment with the oil-compost, prepared according to the directions already given. About an handful of the compost was put to the root of each cauliflower plant. In all other respects the alley was managed like the rest. The plants in general flowered very well; but those to which I applied the compost sprung up hastily with small stalks, and produced very poor flowers. I imputed this unfavourable appearance to the freshness of the compost, which was only a few weeks old. In the September following this unsuccessful experiment, I planted the same alleys with early cabbages. The necessity of meliorating the compost was in this trial fully confirmed. For the cabbages that grew upon the alley, which in May had received the compost, were larger and in all respects finer than the others."

Exp. IV. by James Stovin, Esq; of Doncaster. "In the year 1769, I made the following trial with the oil-compost, prepared as above directed. One acre sown with barley, and manured with oil-compost at 18s. produced five quarters five bushels. An acre adjoining, sown with barley, and manured with 12 loads of rotten dung at 3l. produced four quarters three bushels and two pecks. The compost-barley was bolder and better corn than the other. In the year 1770, the dunged acre produced of rye, three quarters. The compost acre of ditto, two quarters six bushels. In the year 1771, the same lands were sown with oats, and the produce was greatly in favour of the dunged acre. These experimental lands

were in a common field that had been long under the *Compost* plough."

Exp. V. by Richard Townley, Esq; of Belfield. "In the spring 1770, I prepared a piece of ground for onions. It was laid out into six beds of the same size, and which were all sown at the same time. Over two of them, the oil compost was scattered in a very moderate quantity. Over other two, pigeon's dung; and over the remaining two, some of my *weed-compost* (formed of putrefied vegetables), which I esteem one of the best manures, for most vegetables, that can be made. The onions came up very well in all the beds; but, in about six weeks, those that were fed with the oil-compost, plainly discovered the advantage they had over the rest, by their luxuriance and colour, and at the end of the summer perfected the finest crop I had ever seen, being greatly superior to the others both in quantity and size. The same spring I made an experiment upon four rows of cabbages, set at the distance of four feet every way. Two were manured with oil-compost, and two with my own. All the plants were unluckily damaged, just before they began to form, by some turkeys getting into the field and plucking off the greatest part of the leaves. However, they so far recovered, in the September following, from 22 to 28 lb. a-piece. The rows proved so equal in goodness, that I could not determine which had the advantage. The same year, one part of a field of wheat exposed to the north-east winds, which, that spring, continued to blow for a month or five weeks, appeared very poor and languid at the time of tillering. Over it I ordered some of the oil-compost to be sown with the hand; which not only recovered, but also pushed forwards the wheat plants in that part of the field, so as to make them little inferior, if any, to the rest. The same spring, I made a comparative experiment, upon four contiguous lands of oats, between the oil-compost and my own weed-compost. The latter had manifestly the advantage, though the other produced a very large and fine crop. I also tried the oil-compost upon carrots, and it answered exceedingly well. I did the same this year (1771) both upon them and my onions, and have the finest crops of these vegetables I ever saw any where upon the same compass of ground."

Exp. VI. by Mr J. Broadbent of Berwick, in Elmet near Leeds.—"On the first of October 1771, I sowed two acres of a light channelly soil with wheat, and harrowed in the compost with the grain. Being at a considerable distance from a large town, we find it very difficult and expensive to procure rotten dung in sufficient quantity for our tillage lands, for which reason we have recourse to land-dressings both for our winter and spring-corn. Rape-dust and soot are principally used; but the present price of both these articles is a heavy tax upon the farmer. To obviate that inconvenience, I resolved to make trial of the oil-compost; and from what I have observed in this one experiment, I am encouraged to make a more extensive use of it the next year. Being well acquainted with the nature and efficacy of soot, I am satisfied, that the above two acres produced as good a crop of wheat as if they had been dressed with that excellent manure."

On the supposition that vegetables are supported by *matter*

Compost. matters of a saline nature, composts formed of different sorts of salts have been contrived, but with less success than the one above treated of. A famous composition of this kind was lately sold by patent, under the name of *Baron Van Haak's compost*. The following experiment is mentioned in the *Georgical Essays*, as made with a view to determine the virtues of it compared with the oil-compost and foot mixed with ashes.—“In the beginning of April 1773, an acre of land was sown with forward oats. I pitched upon one land in the middle of the piece, which I esteemed better than any of the rest, and upon this I scattered *Baron Van Haak's compost*, in the quantity directed in his instructions. On one side I manured a land with the oil-compost, but rather with a less quantity than directed; and on the other side, I manured two lands with dry coal-ashes sifted fine, and an equal quantity of foot. The lands upon which this experiment was made, were much worn out with a long succession of crops. The lands which had the benefit of the ashes and foot, produced an exceeding fine crop; the oil-compost produced a tolerable good one; but that which had only the assistance of the baron's compost, produced a very poor one. It could not have been worse had it been left destitute of every assistance.”

Composts, made with putrefied animal substances, will no doubt answer much better, in most cases, than any other kind of manure, but they are difficult to be procured. The following is recommended by Dr Hunter of York.—“Take a sufficient quantity of sawdust, incorporate it with the blood and offal of a slaughter-house, putting a layer of one and a layer of the other till the whole becomes a moist and fetid composition. Two loads of this compost, mixed with three loads of earth, will be sufficient for an acre of wheat or spring-corn. Being a kind of top-dressing, it should be put on at the time of sowing, and harrowed in with the grain. The present year I have a field of wheat manured in this manner, and have the pleasure to say, that it is extremely clean, and has all the appearance of turning out an excellent crop. As this kind of compost lies in a small compass, it seems well adapted for the use of such farmers as are obliged to bring their manures from a distance. It is besides extremely rich, and will probably continue in the land much longer than fold-yard or stable-dung. I apprehend that it is capable of restoring worn out land to its original freshness; and I am induced to be of that opinion, from the appearance of the above crop, which is now growing upon land much impoverished by bad management.”

Another compost, prepared from whales flesh, is recommended by Mr Charles Chaloner.—“I have a particular pleasure (says he) in describing and making public the best method of forming a compost from whales flesh, as recommended to me by Dr Hunter. Having marked out the length and breadth of your intended dung-hill, make the first layer of earth about a foot in thickness. Moor-earth, or such as is taken from ant-hills, is the best for this purpose. Over the earth lay one layer of long litter, from the fold-yard or stable, about 12 inches in thickness, then a layer of whale flesh, and over that another layer of dung. Repeat the operations till the heap be raised

about six feet, then give it a thick covering of earth, and coat the heap with sods. In this manner each layer of flesh will be placed between two layers of dung. In about a month turn the whole in the usual manner, which will occasion a strong degree of heat and fermentation. When turned, coat with earth as before, with a view to confine the putrid steam which would otherwise escape. In a month or two the heap will be found to be considerably fallen, when it should have a second turning as before. The operation of turning must be repeated at proper intervals, till the whole becomes an uniformly putrid mass. The whale-flesh is of different degrees of firmness, some of it being almost liquid; and, in proportion to its firmness, the heap will become sooner or later fit for use. In general, the compost should not be used till 12 months old; but that depends upon circumstances. Guard the heap from dogs, pigs, badgers, and vermin, as these animals are remarkably fond of whale-flesh. This animal compost may with great advantage be applied to all purposes where good rotten dung is required. I have used it with great success for cabbages, and find it an excellent dressing for meadow-ground. According to the best computation, one hogshhead of whale refuse, will make eight loads of dung; which when we consider the great facility with which this basis of our dung-hill may be carried, is a momentous concern to such farmers as lie remote from a large town.” See MANURE.

COMPOST, in gardening, is a mixture of several earths, earthy substances, and dungs, either for the improvement of the general soil of a garden, or for that of some particular plants. Almost every plant delights in some peculiar mixture of soils or compost, in which it will thrive better than in others. The most remarkable and generally useful of these, are taken notice of under the description of the several botanical articles, as they occur in the order of the alphabet.

COMPOSTELLA, a celebrated town of Spain, and capital of Galicia, with an archbishop's see, and an university. The public squares, and the churches, particularly the Metropolitan church, are very magnificent. It has a great number of monasteries, for both sexes, and about 2000 houses. It is pretended that the body of St James was buried here, which draws a great number of pilgrims from most parts of Christendom. They walk in procession to the church, and visit his wooden image, which stands on the great altar, and is illuminated with 40 or 50 wax-candles. They kiss it three times with a very respectful devotion, and then put their hats on its head. In the church there are 30 silver lamps, always lighted, and six chandeliers of silver, five feet high. The poor pilgrims are received into an hospital, built for that purpose, which stands near the church; and round it are galleries of free stone, supported by large pillars. The archbishop is one of the richest prelates in Spain, having 70,000 crowns a-year. From this town the military order of St Jago, or St James, had its origin. It is seated in a peninsula, formed by the rivers Tambrá and Ulla, in a pleasant plain. W. Long. 7. 17. N. Lat. 42. 54.

NEW COMPOSTELLA, a town of North America, in New Spain, and province of Xalisco, built in 1531. It

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Compo-
stella.

Compound It is seated near the South Sea. W. Long. 110. 12. N. Lat. 21. 0.

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fion.

COMPOUND, in a general sense, an appellation given to whatever is composed or made up of different things; thus we say, a compound word, compound sound, compound taste, &c.—*Compound* differs from *complex*, and stands opposed to *simple*. See **COMPLEX** and **SIMPLE**.

COMPOUND Flower. See *COMPOSITUS Flos*.

COMPOUND Interest, called also *interest upon interest*, is that which is reckoned not only upon the principal, but upon the interest itself forborne; which hereby becomes a sort of secondary principal. See **INTEREST**.

COMPOUND Motion, that motion which is effected by several conspiring powers. Powers are said to conspire if the direction of the one be not quite opposite to that of the other; as when the radius of a circle is conceived to revolve about a centre, and at the same time a point to move straight along it.

COMPOUND Numbers, those which may be divided by some other number besides unity, without leaving any remainder; such are 18, 20, &c. the first being measured by the numbers 2, 6, or 9; and the second by the numbers 2, 4, 5, 10.

COMPOUND Quantities. See **ALGEBRA**.

COMPOUND Ratio, is that which the product of the antecedents of two or more ratios has to the product of their consequents. Thus, 6 to 72 is in a ratio compounded of 2 to 6, and of 3 to 12.

COMPOUND (substantive), the result or effect of a composition of different things; or a mass formed by the union of many ingredients.

COMPREHENSION, in English church-history, denotes a scheme proposed by Sir Orlando Bridgman in 1667-8, for relaxing the terms of conformity in behalf of Protestant dissenters, and admitting them into the communion of the church. A bill for this purpose was drawn up by Lord Chief-Baron Hale, but disallowed. The attempt was renewed by Tillotson and Stillingfleet in 1674, and the terms were settled to the satisfaction of the nonconformists; but the bishops refused their assent. This scheme was likewise revived again immediately after the Revolution; the king and queen expressed their desire of an union; however the design failed after two attempts; and the act of toleration was obtained.

COMPREHENSION, in metaphysics, is that act of the mind whereby it apprehends or knows any object that is presented to it, on all the sides whereon it is capable of being apprehended or known. To comprehend a thing is defined by the schoolmen, *rem aliquam totam et totaliter cognoscere*.

COMPREHENSION, in rhetoric, a trope or figure whereby the name of a whole is put for a part; or that of a part for a whole; or a definite number of any thing for an indefinite.

COMPRESS, in surgery, a bolster of soft linen cloth, folded in several doubles, frequently applied to cover a plaster, in order not only to preserve the part from the external air, but also the better to retain the dressings or medicines.

COMPRESSION, the act of pressing or squeezing some matter together, so as to set its parts nearer to each other, and make it possess less space. *Compression* properly differs from *condensation*, in that the lat-

ter is performed by the action of cold, the former by some external violence.

COMPROMISE, a treaty or contract, whereby two contending parties establish one or more arbitrators to judge of and terminate their difference in an amicable manner.

COMPTON (Henry), bishop of London, was the youngest son of Spencer Earl of Northampton, and born in 1632. After the restoration of Charles II. he became cornet of a regiment of horse: but soon after quitting the army for the church, he was made bishop of Oxford in 1674; and about a year after translated to the see of London. He was entrusted with the education of the two princesses Mary and Anne, whom he also afterwards married to the princes of Orange and Denmark: and their firmness in the Protestant religion was in a great measure owing to their tutor, to whom, when popery began to prevail at court, it was imputed as an unpardonable crime. He was suspended from his ecclesiastical function by James II. but was restored by him again on the prince of Orange's invasion. He and the bishop of Bristol made the majority for filling the vacant throne with a king: he performed the ceremony of the coronation; was appointed one of the commissioners for raising the liturgy; and laboured with much zeal to reconcile dissenters to the church. His spirit of moderation made him unpopular with the clergy, and in all probability checked his further promotion. He died in 1713; but living in busy times, did not leave many writings behind him.

COMPTROLLER. See **CONTROLLER**.

COMPULSOR, an officer under the Roman emperors, dispatched from court into the provinces, to compel the payment of taxes, &c. not paid within the time prescribed. The word is formed of the verb *compellere*, "to oblige, constrain." These were charged with so many exactions, under colour of their office, that Honorius cashiered them by a law in 412.

The laws of the Visigoths mention military compulsors; which were officers among the Goths, whose business was to oblige the tardy soldiers to go into the fight, or to run to an attack, &c.

Cassian mentions a kind of monastic compulsors, whose business was to declare the hours of canonical office, and to take care the monks went to church at those hours.

COMPUNCTION, in theology, an inward grief in the mind for having offended God. The word comes from *compungere*, of *pungere*, "to prick."—The Romanists own their confession insignificant unless attended with compunction or pricking of heart.

Among spiritualists, compunction bears a more extensive signification; and implies not only a grief for having offended God, but also a pious sensation of grief, sorrow, and displeasure, on other motives. Thus, the miseries of life, the danger of being lost in the world, the blindness of the wicked, &c. are to pious people motives of compunction.

COMPURGATOR, one that, by oath, justifies another person's innocence. Compurgators were introduced as evidences in the jurisprudence of the middle ages. Their number varied according to the importance of the subject in dispute, or the nature of the crime with which a person was charged.

Compro-
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Compur-
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Computa-
tion
Conca.

COMPUTATION, in a general sense, the manner of estimating time, weights, measure, moneys, or quantities of any kind.—The word is sometimes also used among mathematicians in the like sense as calculation.

COMUM (anc. geog.), a town of the Orobii, of an ancient standing, and formerly powerful, daring to dispute with the Romans: *Comenses*, the people; *Comensis Ager*, the epithet. It became afterwards no inconsiderable municipium, to which Julius Cæsar added 5000 new colonists (Strabo); whence it was generally called *Novocomum*, and the people *Novocomenses*. But in time it recovered its ancient name, *Comum*; Pliny the Younger, a native of that place, calling it by no other name. Now *Como*, in the duchy of Milan, at the south end of the lake of that name. E. Long. 9. 35 N. Lat. 46.

COMUS, in mythology, the god of jollity or festivity. There is great reason to believe he was the Chamos of the Moabites; Beel-Phegor, Baal-Peor, Priapus, and Bacchus. He is represented under the appearance of a young man, with an inflamed red countenance, his head inclined, and crowned with flowers; his air drowsy; leaning on a huntsman's spear in his left hand, and holding an inverted torch in his right. His statue was placed at the chamber doors of new married persons; his pedestal crowned with flowers.

CON, or COND. See COND.

CONANT (Dr John), a learned English divine, born in 1608. He took his degrees at Exeter College Oxford; was, by the parliament, constituted one of the assembly of divines, though he seldom, if ever, sat with them; and in 1657 was admitted vice-chancellor of the university. On the restoration he was one of the commissioners, and assisted at the conferences in the Savoy; but was deprived by the act of uniformity: after eight years he was confirmed, and was made arch-deacon of Norwich, and prebendary of Worcester. In 1686 he lost his sight; and died in 1693; leaving a number of admired sermons, afterwards published in six volumes.

CONARION, or CONOIDES, a name for the pineal gland. See ANATOMY, n° 132.

CONATUS, a term frequently used in philosophy and mathematics, defined by some to be a quantity of motion, not capable of being expressed by any time or length; as the *conatus recedendi ab axe motus*, is the endeavour which a body, moved circularly, makes to recede, or fly off from the centre or axis of its motion.

CONCA (Sebastian), called *Cavalier*, a celebrated history and portrait painter, was born at Gaeta in 1679, and placed as a disciple with Francesco Solimena, an incomparable master. Under his direction Conca exerted his utmost industry to obtain a proper knowledge of the true principles of the art of painting; nor did he permit any kind of amusement to withdraw his attention from his studies. Solimena soon perceived in his disciple such talents, and such a disposition, as would qualify him to make a very great progress; and on that account he conceived so strong an affection for him, that he not only afforded him the best instructions, but often employed him to sketch after his own designs; took him along with him to Monte Cassino, where he was to paint a chapel in fresco; and there made Conca acquainted with every thing

relative to that manner of painting. At his return to Naples with Solimena, he was, if possible, still more assiduous to improve himself to the utmost; and entered on a project that might at once advance his income, and add to his expertness in his profession. That project was, to paint portraits in a small size and at a low rate: by which scheme all ranks of persons crowded to him; and beside the pecuniary advantages resulting from it, he acquired an extraordinary freedom of hand in penciling and colouring; a good habit of imitating nature with an elegant choice; and likewise great diversity of airs of heads, which were of extraordinary use to him in his future beautiful compositions. As he had a great desire to see Rome, he obtained permission from Solimena to indulge his inclination; and although he was near thirty years of age when he visited that city, yet he spent eight years in constant study after the antiques, after Buonaroti, Raphael, and the Caracci, and perfected himself in every part of his profession. The fame of his works soon spread throughout Rome, and procured him the patronage of Cardinal Ottobuoni, who was a princely encourager of artists; and Conca having shown an elegant proof of his abilities in a composition representing Herod inquiring of the wise men the place of the birth of the Messiah, the figures being as large as life, the Cardinal thought it so excellent a performance that he rewarded him in a munificent manner, entertained him in his own palace, and introduced him to Pope Clement XI. who appointed Conca to paint the picture of the prophet Jeremiah in the church of S. John Lateran; which he executed with universal applause. On that occasion the pope was desirous to give him some particular mark of his esteem; and therefore, in a general assembly of the academicians of St Luke, he conferred on him the order of knighthood, and the cardinal presented him with a rich diamond cross, which Conca, out of respect to his patron, always wore at his bosom. From that time he was incessantly employed, and his works were solicited by most of the princes of Europe. The churches and chapels of every part of Italy are enriched with some of his compositions; of which he painted an incredible number, as he lived to a very advanced age, and never discontinued his labours. He was earnestly invited by Philip V. of Spain to visit his court, but he could not be prevailed on to leave Rome. He painted two admirable pictures for the king of Poland, with figures as large as life; in one was represented Alexander presenting Bucephalus to Philip, after he had managed him; a grand composition, with a multitude of figure, correctly designed, and charmingly grouped and disposed; the whole being adorned with most elegant architecture, in true and beautiful perspective. The other was the marriage of Alexander with Roxana, the daughter of Darius, which was in every respect equal to the former. He was at last so strongly pressed to go to Naples, that he undertook the journey: and was received in that kingdom with all the respect and honour due to his merit; and there he finished several noble designs, as also at Gaeta his native city. While he continued at Naples, he received in the royal presence a snuff-box of very great value, presented to him in the king's name by the marquis of Tanucci, at that time prime minister; and in the year

Conca.

Concale
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Concep-
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1757, the king was pleased to ennoble him and all his descendants. At that time he was 78, and it is confidently said that he died in 1761 aged 82, which is very probable, though not positively certain. He understood perspective and architecture thoroughly, and added to it a fine understanding of the chiaro-scuro. His style of composition is grand and elegant; his design very correct; his disposition ingenious; his attitudes and expression full of truth, nature, and variety; and his colouring is excellent. The history of Diana and Actæon, by Conca, is in the possession of the earl of Pembroke at Wilton.

CONCALE BAY, is on the coast of France in Brittany, where the English forces landed in June 1758, in order to go to St Maloes; which they did, and burnt all the ships in that harbour, which were above 100, of all sorts. Concale is the town which gives name to the bay, and is famous for oysters. It is 18 miles east of St Maloes, and 197 west of Paris. W. Long. 1. 47. N. Lat. 48. 41.

CONCARNEAU, a town of France, in Bretagne, with a harbour and a castle. E. Long. 3. 45. N. Lat. 47. 55.

CONCATENATION, a term chiefly used in speaking of the mutual dependence of second causes upon each other.

CONCAVE, an appellation used in speaking of the inner surface of hollow bodies, but more especially of spherical ones.

CONCAVE Glasses, such as are ground hollow, and are usually of a spherical figure, though they may be of any other, as parabolical, &c. All objects seen through concave glasses appear erect and diminished.

CONCENTRATION, in general, signifies the bringing things nearer a centre. Hence the particles of salt, in sea-water, are said to be concentrated; that is, brought nearer each other, by evapourating the watery part.

CONCENTRIC, in mathematics, something that has the same common centre with another: it stands in opposition to *eccentric*.

CONCEPTION, in logic, the simple apprehension or perception which we have of any thing, without proceeding to affirm or deny any thing about it. Some writers, as Lord Kames, distinguish between conception and perception; making the latter to denote the consciousness of an object when present, or to include the reality of its object; whereas conception expresses the forming an idea of an object whether present or absent, or without any conviction of its reality.

CONCEPTION, in medicine, denotes the first formation of the embryo, or foetus, in the womb.

Conception is no other than such a concurrence and commixture of the prolific seed of the male with that of the female, in the cavity of the uterus, as immediately produces an embryo.

The symptoms of conception or pregnancy are, when, in a few days after the conjugal act, a small pain is perceived about the navel, and is attended with some gentle commotions in the bottom of the abdomen; and within one, two, three, or even four, months, the menses cease to flow, or prove in less quantity than usual. Upon the first failure of this kind, the woman begins to count the series of her weeks, without taking any notice of the time before

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elapsed; after this, or between the second or third months, but generally about the third, the motions of the embryo become perceivable to the mother; who hereupon becomes troubled with a nausea, vomiting, loathing, longing, &c. About this time the breasts begin to swell, grow hard and painful, and contain a little milk; the nipples also become larger, firmer, and darker coloured, a livid circle appearing round them: the eyes seem sunk and hollow. During the two first months of pregnancy, the woman grows thinner and slenderer; the abdomen being also depressed; though it afterwards distends, and grows gradually larger.

The manner wherein conception is effected is thus laid down by the modern writers: In the superficies of the ovaries of women, there are found little pellucid spherules, consisting of two concentric membranes filled with a lymphatic humour, and connected to the surface of the ovaria, underneath the tegument, by a thick calyx, contiguous to the extremities of the minute ramifications of the Fallopian tubes.

These spherules, by the use of venery, grow, swell, raise and dilate the membrane of the ovary into the form of papillæ; till, the head propending from the stalk, it is at length separated from it; leaving behind it a hollow cicatrix in the broken membrane of the ovary; which, however, soon grows up again.

Now, in these spherules, while still adhering to the ovary, foetuses have been frequently found; whence it appears, that these are a kind of ova, or eggs, deriving their structure from the vessels of the ovary, and their liquor from the humours prepared therein.

Hence also it appears, that the Fallopian tubes being swelled and stiffened by the act of venery, with their muscular simbræ, like fingers, may embrace the ovaries, compress them, and by that compression expand their own mouths: and thus the eggs, now mature, and detached as before, may be forced into their cavities, and thence conveyed into the cavity of the uterus; where they may either be cherished and retained, as when they meet with the male seed: or, if they want that, again expelled.

Hence the phenomena of false conceptions, abortions, foetuses found in the cavity of the abdomen, the Fallopian tubes, &c. For in coition, the male seed, abounding with living animalcules, agitated with a great force, a brisk heat, and probably with a great quantity of animal spirits, is violently impelled through the mouth of the uterus, which on this occasion is opener, and through the valves of the neck of the uterus, which on this occasion are laxer than ordinary, into the uterus itself; which now, in like manner, becomes more active, turgid, hot, inflamed, and moistened with the flux of its lymph and spirits, by means of the titillation excited in the nervous papillæ by the attrition against the rugæ of the vagina.

The semen thus disposed in the uterus, is retained, heated, and agitated, by the convulsive constriction of the uterus itself; till meeting with the ova, the finest and most animated part enters through the dilated pores of the membranula of the ovum, now become glandulous; is there retained, nourished, dilated; grows to its umbilicus, or navel; stifles the other less lively animalcules; and thus is conception effected.

Hence it appears, that conception may happen in any part where the semen meets with an ovum: thus

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whether it be carried through the Fallopian tube to the ovary, and there cast upon the ovum; or whether it meet with it in some recess of the tube itself; or, lastly, whether it join it in the cavity of the uterus, it may still have the same effect, as it appears from observation actually to have done. But it is probable, that conception is then most perfect when the two, viz. the semen and ovum, are carried at the same time into the uterus, and there mixed, &c.

Other anatomists choose to suppose the male seed taken up, before it arrives in the uterus, by the veins which open into the vagina, &c. and thus mixed with the blood; by which, in the course of circulation, it is carried, duly prepared, into the ovary, to impregnate the eggs.

It has been advanced by several writers, that women may possibly conceive in their sleep, and be with child without any knowledge of the occasion of it. As ridiculous and absurd as this doctrine may appear to the generality of the world, no less an author than Genfili has thought it worthy a particular dissertation.

CONCEPTION Immaculate of the Holy Virgin, is a feast established in honour of the holy virgin, particularly with regard to her having been conceived and born *immaculate*, i. e. without original sin, held in the Romish church on the 8th of December. The immaculate conception is the great head of controversy between the Scotists and Thomists; the former maintaining, and the latter impugning it. In the three Spanish military orders, of St James of the sword, Calatrava, and Alcantara, the knights take a vow at their admission to defend the immaculate conception. This resolution was first taken in 1652. Peter d'Alva has published 48 huge volumes in folio on the mysteries of the conception.

CONCEPTION, an episcopal town of Chili in South America. It is situated in W. Long. 79. 12. S. Lat. 36.43; and is the oldest European settlement in Chili. and the second in point of dignity. On their first settlement here, the Spaniards were repeatedly driven off by the Indians, so that they were obliged to take up their residence at St Jago. Since that time both the cities of Conception and St Jago have been frequently destroyed by earthquakes. In the year 1730 both of them were laid in ruins by a dreadful shock, the first concussions of which were attended with an unusual swelling of the sea, that overturned the few houses which had escaped the ravages of the earthquake. The harbour is good, and pretty much frequented; on which account the city is regarded as a place of consequence. The king allows annually 350,000 pieces of eight for the support of a garrison of 3500 men; a corps that is seldom complete. None of the fortifications are considerable; but those towards the land are wretched. The Spaniards now live in tolerable security with respect to the Indians, and have no notion of any attack from the land side. It is said indeed, that not only this but all the settlements in Chili and Peru would fall an easy prey to the attacks of a foreign enemy; the fortifications being in ruins, and the garrisons scarce half the number required by the king: owing to the avarice, ignorance, and supine negligence of the governors, who study nothing but to enrich themselves.

CONCEPTION, a town of North America, in New

Spain, and in the Audience of Guatimali. It is seated near the sea-coast, 100 miles west of Porto-bello, and a small river that runs into the sea. W. Long. 83. 5. N. Lat. 10. 0.

CONCERT, or *CONCERTO*, in music, a number or company of musicians, playing or singing the same piece of music or song at the same time.

CONCERTATO intimates the piece of music to be composed in such a manner, as that all the parts may have their recitativos, be it for two, three, four, or more voices or instruments.

CONCERTO GROSSI, the grand chorus of a concert, or those places where all the several parts perform or play together.

CONCESSION, in general, signifies either the act of granting or yielding any thing, or the thing itself which is so granted or yielded.

CONCESSION, in rhetoric, a figure, whereby something is freely allowed, that yet might bear dispute, to obtain something that one would have granted to him, and which he thinks cannot fairly be denied, as in the following concession of Dido, in Virgil:

"The nuptials he disclaims, I urge no more;
"Let him pursue the promis'd Latian shore.
"A short delay is all I ask him now;
"A pause of grief, an interval from wo."

CONCHA, in zoology, a synonyme of the *MYTILUS*, *SOLEN*, and other shell-fish.

CONCHES, a town of Normandy, with a Benedictine abbey, which carries on a considerable trade. It is seated on the top of a mountain, in the territory of Ouche, 45 miles north-west of Paris. E. Long. 0. 51. N. Lat. 48. 58.

CONCHITES MARMOR, a name given by the ancients to a species of marble dug near Megara, and remarkable for containing a great number of sea-shells, and other marine bodies immersed in it.

CONCHOID, in geometry, the name of a curve, given to it by its inventor Nicomedes. See *FLUXIONS*.

CONCHYLIA, a general name for all petrified shells, as limpets, cochleæ, nautili, conchæ, lepadæ, &c.

CONCIATOR, in the glass art, is, for the crystal-glass, what the founder is at the green-glass houses. He is the person that weighs and proportions the salt on ashes and sand, and works them with a strong fire till they run into lumps and become white; and if the metal be too hard, and consequently brittle, he adds salt or ashes, and if too soft, sand; still mixing them to a fit temper, which is only known by the working.

CONCINNOUS INTERVALS, in music, are such as are fit for music, next to, and in combination with, concords; being neither very agreeable nor disagreeable in themselves; but having a good effect, as by their opposition they heighten the more essential principles of pleasure: or as, by their mixture and combination with them, they produce a variety necessary to our being better pleased.

CONCINNOUS System, in music. A system is said to be concinnous, or divided concinnously, when its parts, considered as simple intervals, are concinnous; and are besides placed in such an order between the extremes, as that the succession of sounds, from one extreme to the other, may have an agreeable effect.

CONCLAMATIO, in antiquity, a shout raised by those present at burning the dead, before they set fire

Concert
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Conclama-
tio.

Conclave fire to the funeral pile. See **SHOUT**. The word was also applied to the signal given to the Roman soldiers to decamp, whence the expression *conclamare vasa*; and *conclamari arma*, was a signal for battle. It was likewise used for a practice of calling to a person deceased three times by his name; and when no reply was returned, they thus expressed his decease, *conclamatum est*. Whence the same term was afterwards applied to the cessation of the Roman empire.

CONCLAVE, the place in which the cardinals of the Romish church meet, and are shut up, in order to the election of a pope.

The conclave is a range of small cells, 10 feet square, made of wainscot: these are numbered, and drawn for by lot. They stand in a line along the galleries and hall of the Vatican, with a small space between each. Every cell has the arms of the cardinal over it. The conclave is not fixed to any one determinate place, for the constitutions of the church allow the cardinals to make choice of such a place for the conclave as they think most convenient; yet it is generally held in the Vatican.

The conclave is very strictly guarded by troops: neither the cardinals, nor any person shut up in the conclave, are spoke to, but at the hours allowed of, and then in Italian or Latin: even the provisions for the conclave are examined, that no letters be conveyed by that means from the ministers of foreign powers, or other persons who may have an interest in the election of the pontiff.

CONCLAVE is also used for the assembly, or meeting, of the cardinals shut up for the election of a pope.

CONCLUSION, in logic, the consequences or judgment drawn from what was asserted in the premises; or the previous judgments in reasoning, gained from combining the extreme ideas between themselves.

CONCOCTION, in medicine, the change which the food undergoes in the stomach, &c. to become chyle. See **CHYLE**.

CONCOMITANT, something that accompanies or goes along with another.

CONCORD, in grammar, that part of construction called *syntax*, in which the words of a sentence agree; that is, in which nouns are put in the same gender, number, and case; and verbs in the same number and person with nouns and pronouns. See **GRAMMAR**.

CONCORD, in music, the relation of two sounds that are always agreeable to the ear, whether applied in succession or consonance.

Form of CONCORD, in ecclesiastical history, a standard-book among the Lutherans, composed at Torgaw, in 1576, and thence called the Book of Torgaw, and reviewed at Berg by six Lutheran doctors of Germany, the principal of whom was James Andreæ. This book contains in two parts, a system of doctrine, the subscription of which was a condition of communion, and a formal and very severe condemnation of all who differed from the compilers of it, particularly with respect to the majesty and omnipresence of Christ's body, and the real manducation of his flesh and blood in the eucharist. It was first imposed on the Saxons by Augustus, and occasioned great opposition and disturbance. The dispute about it was revived in Switzerland in 1718, when the magistrates of Bern published an order for

adopting it as the rule of faith; the consequence of which was a contest, that reduced its credit and authority.

CONCORDANCE, a dictionary or index to the Bible, wherein all the leading words, used in the course of the inspired writings, are ranged alphabetically; and the various places where they occur referred to; to assist in finding out passages, and comparing the several significations of the same word.

Cardinal Hugo de St Charo, is said to have employed 500 monks at the same time in compiling a Latin concordance: besides which, we have several other concordances in the same language; one, in particular, called the *concordance* of England, compiled by J. Darlington, of the order of Predicants; another more accurate one, by the Jesuit de Zamora.

R. Mordecai Nathan has furnished us with a Hebrew concordance, first printed at Venice in 1523, containing all the Hebrew roots branched into their various significations, and under each signification all the places in scripture wherein it occurs: but the best and most useful Hebrew concordance is that of Buxtorf, printed at Basil in 1632.

Dr Taylor published, in 1754, a Hebrew concordance in two volumes folio, adapted to the English Bible, and disposed after the manner of Buxtorf.

The Greek concordances are only for the New Testament: indeed we have one of Contr. Kircher's on the Old; but this is rather a concordantial dictionary than a concordance; containing all the Hebrew words in an alphabetical order; and underneath all the interpretations or senses the LXX. give them; and in each interpretation, all the places where they occur in that version.

In 1718, Trommius published his Greek concordance for the Septuagint at Amsterdam, in two volumes folio; and Schmidius improving on a similar work of H. Stephen, has given an excellent Greek concordance for the New Testament, the best edition of which is that of Leipzig, an. 1717.

Calasius, an Italian Cordelier, has given us concordances of the Hebrew, Latin, and Greek, in two columns: the first, which is Hebrew, is that of R. Mordecai Nathan, word for word, and according to the order of the books and chapters: in the other column is a Latin interpretation of each passage of scripture quoted by R. Mordecai; this interpretation is Calasius's own; but in the margin he adds that of the LXX. and the Vulgate, when different from his. The work is in 4 vols folio, printed at Rome in 1621.

We have several very copious concordances in English, as Newmann's, &c. but the last and best esteemed is that in 4to. by Alex. Cruden.

CONCORDANT VERSES, such as have several words in common; but which, by the addition of other words, convey an opposite, at least a different meaning. Such are those,

Et { canis } in silva { venatur } & omnia { servat. }
{ lupus } { nutritur } { vastat. }

CONCORDAT, in the Canon law, denotes a covenant or agreement concerning some beneficiary matter, as a resignation, permutation, promotion, or the like.

The council of Trent, sess. vi. *de reform.* cap. 4. speaking of concordats made without the authority

Concor-
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Concretion

and approbation of the pope, calls them *concordias quæ tantum suos obligant auctores, non successores*. And the congregation of cardinals, who have explained this decree, declares also that a concordat cannot be valid so as to bind successors, unless confirmed by the pope.

CONCORDAT is also used, absolutely, among the French, for an agreement concluded at Bologna in 1516, between pope Leo X. and Francis I. of France, for regulating the manner of nominating to benefices.

The concordat serves in lieu of the Pragmatic sanction, which has been abrogated; or, rather, it is the pragmatic sanction softened and reformed. The concordat between the pope and the republic of Venice resembles the former.

There is also a German concordat, made between the emperor Frederic III. and the princes of Germany, in 1448, relating to beneficiary matters, confirmed by pope Nicholas V.

CONCORDIA, a town of Italy, in the duchy of Mirandola; seated on the river Secchia, 5 miles west of Mirandola, and 15 miles south-east of Mantua; subject to the house of Austria. E. Long. 11. 22. N. Lat. 44. 52.

CONCORDIA (anc. geog.), a town of the Veneti, situated at the confluence of the rivers Romatinus Major and Minor, 31 miles to the west of Aquileia, (Pliny, Ptolemy, Antonine); a colony surnamed *Julia*. Its ruins still go by the name of *Concordia*.—Another Concordia (Ptolemy), of Lusitania, to the north-west of Trajan's bridge, on the Tagus.—A third of the Nemetes in Belgica, on the west side of the Rhine; a Roman fortress, situated between Brocomagus and Noviomasus. Now Drusenheim, in Alsace. E. Long. 8°, Lat. 48° 40'.

CONCORDIA, a Pagan divinity of the Romans. She had a temple on the declivity of the capital; another in the portico of Livia; and a third on Mount Palatine, built of brass by Cn. Flavius, on account of a vow made for reconciling the senate and people. She was pictured with a cup in her right hand; in her left was sometimes a sceptre, and sometimes a cornucopia. Her symbols were two hands joined, as is seen in a coin of Aurelius Venus, and another of Nero: also two serpents twisting about a caduceus. She was addressed to promote the peace and union of families and citizens.

CONCOU, in botany, a name given by the people of Guinea to an herb, which is in great esteem among them for killing that troublesome sort of worm called the *Guinea-worm*, that breeds in their flesh. They bruise the leaves, and mixing them with oil, apply them in form of a cataplasm.

CONCRETE, in the school-philosophy, an assemblage or compound.

CONCRETE, in natural philosophy and chemistry, signifies a body made up of different principles, or any mixed body: thus, soap is a factitious concrete, mixed together by art; and antimony is a natural concrete, or a mixed body compounded in the bowels of the earth.

CONCRETION, the uniting several small particles of a natural body into sensible masses or concretes, whereby it becomes so and so figured and determined, and is endued with such and such properties.

CONCRETION is also the act whereby soft bodies are

rendered hard; or an insensible motion of the particles of a fluid or soft body, whereby they come to a consistence. It is indifferently used for induration, condensation, congelation, and coagulation.

CONCUBINAGE sometimes expresses a criminal or prohibited commerce between the two sexes; in which sense it comprehends adultery, incest, and simple fornication.

In its more restrained sense, concubinage is used for a man's and a woman's cohabiting together in the way of marriage, without having passed the ceremony thereof.

Concubinage was anciently tolerated: the Roman law calls it an allowed custom, *licita consuetudo*. When this expression occurs in the constitutions of the Christian emperors, it signifies what we now call a *marriage in conscience*.

The concubinage tolerated among the Romans in the time of the republic, and of the heathen emperors, was that between persons not capable of contracting marriage together: nor did they even refuse to let inheritances descend to children which sprung from such a tolerated cohabitation. Concubinage between such persons they looked on as a kind of marriage, and even allowed it several privileges; but then this concubinage was confined to a single person, and was of perpetual obligation as much as marriage itself. Hottoman observes, that the Roman laws had allowed of concubinage long before Julius Cæsar made that law whereby every one was allowed to marry as many wives as he pleased. The emperor Valentinian, Socrates tells us, allowed every man two.

CONCUBINAGE is also used for a marriage performed with less solemnity than the formal marriage; or a marriage with a woman of inferior condition, and to whom the husband does not convey his rank or quality. Cujas observes, that the ancient laws allowed a man to espouse, under the title of *concubine*, certain persons, such as were esteemed unequal to him, on account of the want of some qualities requisite to sustain the full honour of marriage. He adds, that though concubinage was beneath marriage, both as to dignity and civil effects; yet was concubine a reputable title, very different from that of mistress among us. The commerce was esteemed so lawful, that the concubine might be accused of adultery in the same manner as a wife.

This kind of concubinage is still in use in some countries, particularly in Germany, under the title of a *half-marriage*, *morgengabic marriage* or *marriage with the left-hand*; alluding to the manner of its being contracted, viz. by the man's giving the woman his left hand instead of the right. This is a real marriage, though without solemnity: the parties are both bound for ever; though the woman be thus excluded from the common rights of a wife for want of quality or fortune.

The children of concubines were not reputed either legitimate or bastards, but natural children, and were capable only of donations. They were deemed to retain the low rank of the mother; and were on this ground unqualified for inheriting the effects of the father.

CONCUBINAGE, in a legal sense, is used as an exception against her that sueth for dower, alleging thereby,

Concubinage.

Concubine
||
Cond.

by, that she was not a wife lawfully married to the party, in whose lands she seeks to be endowed, but his concubine.

CONCUBINE, a woman whom a person takes to cohabite with him, in the manner, and under the character, of a wife, without being authorized thereto by a legal marriage.

CONCUBINE is also used for a real, legitimate, and only wife, distinguished by no other circumstance but a disparity of birth or condition between her and the husband. Du Cange observes, that one may gather from several passages in the epistles of the popes, that they anciently allowed of such concubines. The seventeenth canon of the first council of Toledo declares, that he who, with a faithful wife, keeps a concubine, is excommunicated; but that if the concubine served him as a wife, so that he had only one woman, under the title of concubine, he should not be rejected from communion: which shows that there were legitimate wives under the title of concubines.

In effect, the Roman laws did not allow a man to espouse whom he pleased; there was required a kind of parity, or proportion, between the conditions of the contracting parties: but a woman of inferior condition, who could not be espoused as a wife, might be kept as a concubine; and the laws allowed of it, provided the man had no other wife.

It is certain the patriarchs had a great number of wives, and that these did not all hold the same rank; some being subaltern to the principal wife; which were what we call *concubines* or half-wives. The Romans prohibited a plurality of concubines, and only had regard to the children issuing from a single concubine, because she might become a legitimate wife. Solomon had 700 wives and 300 concubines: the emperor of China has sometimes two or three thousand concubines in his palace. Q. Curtius observes, that Darius was followed in his army by 365 concubines, all in the equipage of queens.

CONCUPISCENCE, according to divines, an irregular appetite, or lust after carnal things, inherent in the nature of man ever since the fall.

COND, CON, or CONN, in sea language, signifies to guide or conduct a ship in her right course. He that cons her, stands aloft with a compass before him, and gives the word of direction to the man at the helm how he is to steer. If the ship go before the wind, or, as they call it, betwixt the sheets, the word is either starboard, or port the helm; according as the conder would have the helm put to the right or left side of the ship, upon which the ship always goes the contrary way. If he says, helm a mid-ship, he would have the ship to go right before the wind, or directly between her two sheets. If the ship sail by a wind, or on a quarter wind, the word is, aloof, keep your luff, fall not off, veer no more, keep her to, touch the wind, have a care of the lee-latch: all which expressions are of the same import, and imply that the steersman should keep the ship near the wind. On the contrary, if he would have her sail more large, or more before the wind, the word is, ease the helm, no near, bear up. If he cries steady, it means, keep her from going in and out, or making yaws (as they call it), howsoever she sails, whether large or before a wind: and

when he would have her go just as she does, he cries, keep her thus, thus, &c.

Condate,
Conde.

CONDATE (anc. geog.), a town of Armorica in Gaul: called *Civitas Rhedonum*, in the Notitia; afterwards *Redonae*; Redonica Regio, the district. Hence the modern name *Rennes*, in Brittany. W. Long. 1.45. Lat. 48. 5. Another Condate of Britain (Antonine); now thought to be Congleton, in Yorkshire; others say in Lancashire.

CONDE (Lewis de Bourbon prince of), was born at Paris Sept. 7. 1621. He was styled Duke d'Enguien, till he succeeded to the title of Prince of Conde by his father's death in 1646. As he was of a tender and delicate constitution, the prince sent him to the castle of Montrond in Berry, that he might breathe a more pure and salutary air. Here he was educated in his infancy by some experienced and prudent citizens wives. When he was of a proper age, the prince took upon himself the task of governor, and appointed for his assistant M. de la Bouffieres, a private gentleman, a man of honour, fidelity, and good nature, and who made it a rule to observe inviolably the orders that were given him. Two Jesuits distinguished for their genius and knowledge were also given him for preceptors. He formed him a household of 15 or 20 officers, all men of the greatest virtue and discretion.

With these attendants the duke d'Enguien went to settle at Bourges, where he frequented the college of Jesuits. Here, besides the ordinary studies, he was taught ancient and modern history, mathematics, geography, declamation; also riding and dancing, in which last he soon excelled. He made such a surprising progress, that before the age of 13 he defended in public some questions in philosophy with incredible applause. At his return from Montrond, he had for his tutor M. de Merille; a man deeply versed in the knowledge of common law, of ancient and modern laws, of the holy scriptures, and of the mathematics. Under his direction the duke went through that new course with prodigious success. He acquired a critical taste in the arts and sciences, which he retained all his life; he never suffered a day to pass without dedicating two or three hours at least to reading; his thirst for knowledge was universal, and he endeavoured to search every thing to the bottom. His chief inclination, however, lay towards the military art; and at the age of 18 he obtained permission to make his first campaign as a volunteer in the army commanded by M. de la Meilleraye. This campaign was unfortunate; and the duke d'Enguien was only a witness of the marshal's imprudence and disgrace. Nevertheless, in this campaign he laid the foundation of that renown which made him afterwards considered as the greatest general of his age.

On his return to Paris, the duke waited upon cardinal Richelieu at Ruel. That minister was so pleased with his conversation, that he soon after made proposals of an alliance with the prince of Conde, by marrying the duke d'Enguien to Claire Clemence de Maille Breza, the cardinal's niece. The duke consented to this match out of obedience to his father; but the force he put upon himself by yielding to it was so great, that he fell dangerously ill. It

was

Conde. was long before he got the better of his distemper; but at length he not only recovered, but became so strong as afterwards to bear the greatest fatigues with ease.

The duke made two more campaigns as a volunteer; the one under the marshal de la Meilleraye, the other in the army of Louis XIII. which conquered Rouffillon. In 1643, at the age of 22, he obtained from the king, at the persuasion of cardinal Mazarin, the command of the army destined to cover Champagne and Picardy; which command was confirmed to him after the king's death by the queen regent, Anne of Austria, to whose interest he was strongly devoted. In this station, though he never had been present at any battle, he soon gave such a specimen of his abilities as crowned him with glory. The Spaniards, who threatened France with an invasion, were defeated by him at Rocroi; and this signal victory made him from that time considered as the guardian genius of his country. He next formed the project of besieging Theonville, and proposed it to the council of regency. They consented with fear and distrust; but the duke carried it into execution with such skill, activity, and courage, that he became justly the subject of general admiration. In two months time Theonville surrendered. At length, having covered Alsace and Lorraine from the enterprizes of the Imperialists, the duke returned to Paris, where he obtained the government of Champagne, and of the city of Stenai.

The three following years were little more than a series of military operations. The three battles of Fribourg, in which the duke d'Enguien triumphed over Velt Marshal count de Mercy, the greatest general in all Germany; the taking of Philippsbourg, and a great number of other places, which rendered him master of the palatinate, and of the whole course of the Rhine: the victory of Nortlingue, by which he revenged the viscount du Turenne's defeat at Mariendal; the siege and conquest of Dunkirk; the good and bad success of his arms in Catalonia, where, though he was forced to raise the siege of Lorida, he kept the Spaniards in awe, and cut to pieces their rear guard; these are the principal events which distinguish the campaigns of 1644, 1645, and 1646.

The victories of the duke d'Enguien, his great reputation and esteem with the people, began now to give umbrage to Mazarin. The cardinal's dislike to him appeared on the death of the duke de Breeze, admiral of France. The prince of Conde earnestly demanded for his son the duke de Breze's places. But Mazarin, afraid of increasing the wealth and power of a prince whom his victories and the love and confidence of the people and the army had already rendered too formidable to him, evaded his request, by persuading the queen to take the admiralty to herself. On the death of his father, the minister's dislike to the young prince of Conde became still more apparent. By the minister's persuasion he had accepted of the command of the army in Catalonia; but, on his arrival at Barcelona, he found neither troops, money, artillery, provisions, nor ammunition. Enraged at this deception, he vented his resentment in bitter complaints and severe threats; but by the resources that

he found in this dilemma, the prince added new lustre to his glory. *Conde.*

The campaign of 1648 was as glorious to Conde as those which preceded it had been. To disconcert at once the projects of the arch-duke Leopold, the prince resolved to attack him even in the heart of the Low Countries; and notwithstanding the considerable difficulties which he had to surmount, he besieged the important city of Ypres, and took it in sight of all the enemies forces.

Notwithstanding this success, Conde saw himself at the point of experiencing the greatest reverse of fortune. His army was a prey to scarcity, to nakedness, contagious distempers, and desertion. For eight months it received no supply from the minister, but half a muster. Every thing was supplied by the prince himself; he lavished his money, and borrowed more to supply his troops. When it was represented to him that he was in danger of ruining himself by such an enormous expence, he replied, that "since he every day ventured his life for the service of his country, he could very well sacrifice his fortune to it. Let but the government exist (added he), and I shall want for nothing."

The French army having been reinforced by 4000 of the troops of Weimar, Conde attacked the Spaniards advantageously encamped near Lens, and gained a complete victory over them, which disabled them from attempting any thing more, and even from supporting themselves. Afterwards he besieged Furnes, the garrison of which, 500 men, surrendered themselves prisoners of war. But the prince was wounded there in the trenches by a musket-shot above the right hip; and the contusion was so great, that he was forced to submit to several incisions.

The French court, animated with the victory at Lens, thought this a proper time to take vengeance on the factions which for some time had violently agitated the kingdom; and accordingly imprisoned Broussel and Blancmenil, two of the principal leaders of the country party. This vigorous proceeding, however, occasioned a general revolt. Two hundred thousand men took arms in Paris, barricaded the streets, invested the palais-royal, and demanded the prisoners. It was necessary to release them; but from that time the regal authority was annihilated; the queen was exposed to a thousand insults, and Mazarin dared no longer venture out of the palais-royal. In this embarrassment the queen recalled the prince of Conde, as the only one from whom she could hope for support. He retired to Ruel, whither the regent had gone with the young king and Mazarin. Anne of Austria proposed to him the reducing of Paris by force of arms: but he calmed the resentments of that princess; and instead of being accessory to her vengeance, he directed all his views to pacify the kingdom, and at length brought about an accommodation between the parties, who desired it with equal ardour. But new incidents soon rekindled the combustion. The treachery of Mazarin, and the artifices of the leaders of the country party, occasioned new cabals and fresh troubles. Conde was caressed by the leaders of both parties; but at last, enraged at the arrogance of the malcontents, who every day formed new pretensions, he

Conde.

he took part openly with the court, though he thought it ungrateful, and protected the minister, though he did not esteem him.

The royal family, the duke of Orleans, Conde, and Mazarin, left Paris privately in the night between the 5th and 6th of January 1646, and went to St Germain. The parliament sent deputies to learn from the queen herself the reasons of her departure, and to beg her to name the citizens whom she suspected, that they might be tried. Mazarin had the imprudence to dismiss them without any answer. Exasperated at this, the people again took up arms in order to defend themselves against the enterprizes of the court, who had determined to block up and to starve the capital, in order to suppress the party of malcontents. With 7 or 8000 men, the broken relics of the last campaign, the prince of Conde formed a design of reducing above 500,000 intrenched behind walls. He had neither money nor magazines; he saw himself in the depth of a most severe winter; nevertheless he triumphed over Paris, and this great success completed his glory. It did him so much the more honour, as during the siege he constantly defeated the troops of the malcontents; he prevailed on the army that marched to their assistance under Turenne, to abandon that general; he stopped the progress of the duke de Longueville, who had caused an insurrection in Normandy; and got the start of the Spaniards, who were advancing to give him battle.

Conde de Retz, co-adjutor of Paris, and afterwards cardinal, was the life and soul of the revolvers, and directed all their motions. He had taken Catiline for his model; and was equally intrepid and capable of the greatest actions; of an exalted genius, but governed by his ambition. He distinguished his hatred to Mazarin by arming the malcontents: and he himself raised at his own expence a regiment which he called the regiment of *Corinth*: as soon as this corps took the field during the blockade of Paris, it was defeated and dispersed. This check was called *the first to the Corinthians*. The peace was signed at St Germain; but neither party carried its point, and scarce any one but Conde acquired glory by this war. After the conclusion of the treaty, the prince repaired to the capital, and traversed all the streets in his coach alone. All persons of any consequence paid their compliments to him, and the parliament sent a solemn deputation to thank him for the peace to which he had so powerfully contributed. The people, however, made loud complaints on account of the king's absence (for the court was not yet returned to Paris), and the malcontents gave reason to apprehend a new insurrection. Conde encouraged the king and queen to return; and at length brought them to Paris, amidst the acclamations and blessings of the public.

The important service which Conde had just done the court intitled him to the acknowledgments of the queen, and especially of Mazarin; but the dark soul of that cardinal only remembered it to punish a too fortunate and too powerful protector. He privately swore the prince's destruction; at least that he should give the whole kingdom a pattern of submission and dependence on his will. However, not to excite the public indignation, he still kept up appearances with the prince, while he secretly spread about him dis-

suspicious, snares of every kind, and the most heinous calumnies. The ungrateful minister deceived the prince by making him the most flattering proposals; and with the most alluring promises which he always found means to avoid fulfilling. The enraged prince despised the minister, and treated him with disdain. After this they were reconciled again only to be again at variance. Each of them in their turn courted the country party, in order to make it subservient to their designs. At last Mazarin thought of an expedient, which but too effectually answered his purpose, of making an irreconcilable quarrel between that party and the prince. There was among the malcontents one marquis de la Boulaie, a man of an infamous character, who had obtained the confidence of the party by false appearances of hatred to the cardinal, but who secretly kept up a correspondence with him. It is pretended that he made him an offer of privately killing Conde. Mazarin was charmed with the proposal; yet he only required Boulaie to exhibit all the proofs of an assassination, and to act in such a manner that every thing might concur to render the country party suspected of that crime. He was punctually obeyed; the coach was stopped; some pistols were fired at it; by which two of the footmen were dangerously wounded; and, after that shameful exploit, la Boulaie took refuge in the hotel of the duke of Beaufort, who was the hero of the party, in order no doubt to countenance the prince's suspicion of the malcontents. Luckily Conde was not in his coach when it was stopped; the cardinal had spread the report of his intended assassination; and in concert with the queen and the prince he had prevailed to have the coach sent away empty, to prove the reality of the attempt. Mazarin counterfeited a zeal for the prince's life; he furiously declaimed against the malcontents, who, he pretended, had made an attempt on a life so precious to the state; and he inflamed Conde's resentment against the duke of Beaufort and the coadjutor, whom he supposed to be the authors of this heinous outrage. The prince was so strongly prejudiced, that he refused to hear them when they appeared before him to justify themselves. He demanded justice against them of the king: he formally accused them before the parliament, and remained inflexible in spite of the pains which the leaders of the party took to demonstrate to him that he had been imposed upon. However, the affair was brought before the parliament; the accused defended themselves, and the coadjutor, who had discovered the cardinal's secret, unmasked him so well, that the prince agreed to a private negotiation with the malcontents; he required nothing more than the coadjutor's leaving Paris, but with the rank of ambassador to Rome or Vienna. That prelate would have consented to it, to satisfy Conde, if Mazarin, some days after, had not given him the choice of any recompence, in order to engage his concurrence in the prince's destruction. Affairs were now in such a dangerous situation, that the cardinal saw clearly it was necessary to hasten to the winding up of the plot. Master of the queen's mind, which he guided as he pleased; and sure of having inflamed against Conde all the resentment of the malcontents; he sought and obtained, by means of the duchess Chevreuse, the support of that powerful faction, which connected itself

Conde.

the

Conde. the more readily with him, in hopes that the prince's fall would soon enable it to crush without difficulty the cardinal himself. The coadjutor had private conferences with the queen and the minister. Conde had notice of it; and in order to discover if it were true, he endeavoured to surprise it from Mazarin's own mouth. "Cardinal (said he, one day), it is publicly reported that you have nightly meetings with the coadjutor, disguised like a trooper." He accompanied this speech with a quick and penetrating look: but the cardinal, who was a perfect master of dissimulation, answered him in such a free, artless-like manner, that he entirely removed Conde's apprehensions; and he slighted the information he had received, of the plot forming against him.

Mazarin wanted nothing but the support of the duke of Orleans; and at last found means, by the duchess of Chevreuse, to inflame the jealousy of that fickle and inconstant prince, and to engage him to consent to the imprisonment of Conde. Having thus united all parties, and fearing no other obstacle, this ungrateful and perfidious minister made preparations for privately arresting the prince: the order for it was signed January 18th 1650. Conde having that day repaired as usual to the palais-royal, to assist at council with the prince of Conti and the duke of Longueville, the queen gave orders to arrest them all three, and convey them without any noise to the castle of Vincennes. She was instantly obeyed, and the princes were strictly guarded in that prison.

In this unexpected reverse of fortune, the fortitude and greatness of Conde's mind appeared only the more remarkable. Confined with the other two princes in the tower of Vincennes, where neither supper, furniture, nor beds, were provided, he contented himself with two new laid eggs, and threw himself in his cloaths, on a truss of straw, where he slept 12 hours without waking. He still retained his cheerfulness, and dedicated the greatest part of his time to reading, the rest to conversation, playing at battle-door and shuttle-cock, to bodily exercises, and the cultivation of flowers.

Mazarin triumphed at the disgrace of the princes, proscribed all those who were attached to Conde, and behaved in the most insolent and arbitrary manner. The prince's friends, however, notwithstanding their being strictly watched, found means to keep up a punctual correspondence with him. They made various attempts to release him: they raised troops; in particular, the dukes of Bouillon and Rochefoucault, and the viscount de Turenne. The princess of Conde engaged the province of Guienne to declare in his favour; she made war, in order to force the court to release him; at length the partizans of the prince signed a treaty with the Spaniards, to labour in concert for his enlargement. But all these efforts would, perhaps, have been ineffectual, if other more powerful resources had not been employed.

In that gallant and warlike age, every thing was managed by the passions and intrigues of five or six women, who possessed the confidence of the leaders of the state, and of the various parties. The princess of Mantua, wife to one of the sons of the elector Palatine, king of Bohemia, principally directed the counsels in the party of the princes. She found means to

reconcile the duke of Orleans, the coadjutor, and the malcontents, with the friends of the prince, and united their efforts against the cardinal. The parliament, on the other side, loudly demanded the release of the prisoners. All the orders of the state united in soliciting it, insomuch that the queen was at last prevailed on to give her consent. At this news, Mazarin was so confounded, that he fled in the disguise of a trooper, and arrived at the gates of Richlieu, where a body of horse waited for him. The parliament, informed by the queen of his flight, thundered forth an arret, by which he was obliged to leave the kingdom, with his family and foreign servants, in the space of 15 days, under the penalty of being exposed to a criminal prosecution. The queen desired to follow him with the king; but the nobles and burghers invested the palais-royal, and prevented the execution of this project, which would have kindled a civil war. Mazarin, therefore, perceiving that it was impossible for the queen to join him, determined to go himself to restore the princes to their liberty, and to get the start of the deputies who were coming to acquaint them with it. On his arrival at Havre, he informed the princes that they were free; he entreated Conde's friendship; and was so abject as to prostrate himself at the feet of him whom he had so basely oppressed. Conde gave him a polite reception, and spoke to him in a free and cheerful tone; but tired with the mean submissions which the cardinal lavished upon him, he left him without making any promise, and set out on his return to Paris, which he entered as it were in triumph, amidst the acclamations of all orders of men, and the demonstrations of a most sincere and general joy.

After this a civil war ensued, in which the prince of Conde sided with the malcontents. Being pressed by the king's army, he retired into the suburbs of St Anthony, where he behaved with the utmost bravery; when the citizens opened their gates and received him in; and a peace ensued soon after. His hatred of the cardinal, however, made him quit Paris, and take refuge among the Spaniards, who made him generalissimo of their forces; and he took Rocroi. The peace of the Pyrenees restored him to his country; and he again signalized himself at the head of the king's armies. Being afflicted with the gout, he refused the command of the army in 1676, and retired to Chartilly, where he was as much esteemed for the virtues of peace, as he had been before for his military ones. He died in 1686, at Fontainebleau.

CONDE, a town of the French Netherlands, in the province of Hainault, with the title of a principality, and a castle. It is one of the strongest towns in this country, and seated near the confluence of the rivers Haine and Scheld. E. Long. 3. 29. N. Lat. 50. 27.

CONDE, a town of France, in Normandy, and in the Bessin, which carries on a considerable trade; seated on the river Nereau. W. Long. 0. 37. N. Lat. 48. 50.

CONDEMNATION, the act of giving judgment, passing or pronouncing sentence against a person subjected thereby to some penalty or punishment, either in respect of life, reputation, or fortune.

Conde,
Condemna-
tion.

Condensa-
tion
||
Condor.

CONDENSATION, the act whereby a body is rendered more dense, compact, and heavy. The word is commonly applied to the conversion of vapour into water, by distillation, or naturally in the clouds. The way in which vapour commonly condenses, is by the application of some cold substance. On touching it, the vapour parts with its heat which it had before absorbed; and on doing so, it immediately loses the proper characteristics of vapour, and becomes water. But though this is the most common and usual way in which we observe vapour to be condensed, nature certainly proceeds after another method: since we often observe the vapours most plentifully condensed when the weather is really warmer than at other times. See the articles **CLOUD**, **EVAPORATION**, &c.

CONDENSER, a pneumatic engine, or syringe, whereby an uncommon quantity of air may be crowded into a given space; so that sometimes ten atmospheres, or ten times as much air as there is at the same time in the same space, without the engine, may be thrown in by means of it, and its egress prevented by valves properly disposed. See **PLATE CXLVI**.

It consists of a brass cylinder, wherein is a moveable piston; which being drawn out, the air rushes into the cylinder through a hole provided on purpose; and when the piston is again forced into the cylinder, the air is driven into the receiver through an orifice, furnished with a valve to hinder its getting out.

The receiver or vessel containing the condensed air, should be made very strong, to bear the force of the air's spring thus increased; for which reason they are generally made of brass: its orifice is fitted with a female screw to receive the male screw at the end of the condenser.

If glass be used for a condenser, it will not suffer so great a degree of condensation; but the experiment will be more entertaining, since the subject may be viewed in the condensed air.

CONDITION, in the civil law, a clause of obligation stipulated as an article of a treaty or a contract; or in a donation of a testament, legacy, &c. in which last case a donee does not lose his donative if it be charged with any dishonest or impossible conditions.

CONDITIONAL, something not absolute, but subject to conditions.

CONDITIONAL Conjunctions, in grammar, are those which serve to make propositions conditional; as *if, unless, provided, &c.*

CONDITIONAL Propositions, in logic, such as consist of two parts connected together by a conditional particle.

CONDITIONAL Syllogism, a syllogism where the major is a conditional proposition. Thus,

If there is a God, he ought to be worshipped.

But there is a God;

Therefore he ought to be worshipped.

CONDIVICNUM (anc. geog.), the capital of the Namnetes, in Armorica. Now Nants in Brittany, on the Loire, from its name *Civitas Namnetum*. W. Long. 1. 30. Lat. 47. 15.

CONDOM, a town of Gascony in France, capital of the Condomois, with a bishop's see. It is but a poor place, and the trade is very small. It is seated on the river Gelisse, in E. Long. 0. 22. N. Lat. 44.

CONDOR, or **CONTOR**, in ornithology. See **VULTUR**.

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CONDORMIENTES, in church-history, religious sectaries, who take their name from lying all together, men and women, young and old. They arose in the 13th century, near Cologne; where they are said to have worshipped an image of Lucifer, and to have received answers and oracles from him.

CONDRIEU, a town of Lyonnois in France, remarkable for its excellent wines. It is seated at the foot of a hill near the river Rhone. E. Long. 4. 33. N. Lat. 45. 28.

CONDRUSII (anc. geog.), a people of Belgica, originally Germans, dwelling about the Maese. Their country is now called *Condrotz*, in the bishopric of Liege, between Luxemburg and the Maese.

CONDUCTOR, in surgery, an instrument which serves to conduct the knife in the operation of cutting for the stone, and in laying up sinuses and fistulas.

CONDUCTORS, in electrical experiments, are those bodies that receive and communicate electricity; and those that repel it are called *non-conductors*. See **ELECTRICITY**.

CONDUIT, a canal or pipe for the conveyance of water, or other fluid.

There are several subterraneous conduits through which the waters pass that form springs. Artificial conduits for water are made of lead, stone, cast-iron, potter's earth, timber, &c.

CONDYLOID and **CORONOID** processes. See **ANATOMY**, n° 26.

CONDYLOMA, in medicine, a tubercle, or calous eminence, which arises in the folds of the anus, or rather a swelling or hardening of the wrinkles of that part.

CONDYLUS, a name given by anatomists to a knot in any of the joints, formed by the epiphysis of a bone.

CONE, in geometry, a solid figure, having a circle for its base, and its top terminated in a point or vertex. See **CONIC SECTIONS**.

Melting Cone, in chemistry, is a hollow cone formed of copper or brass, with a handle, and with a flat bottom adjoining to the apex of the cone, upon which it is intended to rest. Its use is to receive a mass of one or more metals melted together, and cast into it. This mass, when cold, may be easily shook out of the vessel, from its figure. Also, if a melted mass consisting of two or more metals, or other substances not combined together, be poured into this vessel, the conical figure facilitates the separation of these substances according to their respective densities. The cone ought to be well heated before the melted mass is thrown into it; that it may not contain any moisture, which would occasion a dangerous explosion. It ought also to be greased internally with tallow, to prevent the adhesion of the fluid matter.

Cone of Rays, in optics, includes all the several rays which fall from any radiant point upon the surface of a glass.

CONE, in botany. See **CONUS**.

CONESSI, a sort of bark of a tree, which grows on the Coromandel coast in the East Indies. It is recommended in a letter to Dr Monro, in the Medical Essays, as a specific in diarrhoeas. It is to be finely pulverized, and made into an electuary with syrup of oranges. The bark should be fresh, and the electua-

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ry new made every day, or second day, otherwise it loses its austere but grateful bitterness on the palate, and its proper effects on the intestines.

CONFARREATION, a ceremony among the ancient Romans, used in the marriage of persons whose children were destined for the honour of the priesthood.

Confarreation was the most sacred of the three modes of contracting marriage among that people; and consisted, according to Servius, in this, that the *pontifex maximus* and *flamen dialis* joined and contracted the man and woman, by making them eat of the same cake of salted bread: whence the term, *far* signifying meal or flour.

Ulpian says, it consisted in the offering up of some pure wheaten bread; rehearsing, withal, a certain formula, in presence of ten witnesses. Dionysius Halicarnassensis adds, that the husband and wife did eat of the same wheaten bread, and threw part on the victims.

CONFECTION, in pharmacy, signifies, in general, any thing prepared with sugar: in particular it imports something preserved, especially dry substances. It also signifies a liquid or soft electuary, of which there are various sorts directed in dispensatories. See PHARMACY.

CONFECTOR, among the ancient Romans, a sort of gladiator, hired to fight in the amphitheatre against beasts; thence also denominated *bestiarius*.

The *confectores* were thus called à *conficiendis bestiis*, from their dispatching and killing beasts.

The Greeks called them *παράβολοι*, q. d. *daring, rash, desperate*; whence the Latins borrowed the appellations *parabolani* and *parabolarii*. The Christians were sometimes condemned to this sort of combat.

CONFECTS, a denomination given to fruits, flowers, herbs, roots, &c. when boiled or prepared with sugar or honey, to dispose them to keep, and render them more agreeable to the taste.

CONFEDERACY, in law, is when two or more persons combine to do any damage to another, or to commit any unlawful act. Confederacy is punishable, though nothing be put in execution; but then it must have these four incidents: 1. That it be declared by some matter of prosecution, as by making of bonds or promises to one another; 2. That it be malicious, as for unjust revenge; 3. That it be false, i. e. against the innocent; and, lastly, That it be out of court, voluntary.

CONFERVA, in botany: A genus belonging to the cryptogamia class of plants; and in the natural method ranking under the 57th order, *Alge*. The tubercles are of different sizes, on capillary, very long fibres. There are 21 species, most of them growing on stones in slow streams, on the sides of cisterns, or in ponds.

CONFESSION, in a civil sense, a declaration or acknowledgement of some truth, though against the interest of the party who makes it; whether it be in a court of justice or out of it. It is a maxim, that in civil matters, the confession is never to be divided, but always taken entire. A criminal is never condemned on his simple confession, without other collateral proofs; nor is a voluntary extrajudicial confession admitted as any proof. A person is not admitted to accuse himself, according to that rule in law, *Non auditur perire volens*. See ARRAIGNMENT.

CONFESSION, among divines, the verbal acknowledgement which a Christian makes of his sins.

Among the Jews it was the custom, on the annual feast of expiation, for the high-priest to make confession of sins to God in the name of the whole people: besides this general confession, the Jews were enjoined, if their sins were a breach of the first table of the law, to make confession of them to God; but violations of the second table were to be acknowledged to their brethren. The confession of the primitive Christians were all voluntary, and not imposed on them by any laws of the church; yet private confession was not only allowed, but encouraged.

The Romish church requires confession not only as a duty, but has advanced it to the dignity of a sacrament: this confession is made to the priest, and is private and auricular; and the priest is not to reveal them under pain of the highest punishment.

CONFESSION of Faith, a list of the several articles of belief in any church.

CONFESSIOAL, or CONFESSIOALARY, a place in churches under the great altar, where the bodies of deceased saints, martyrs, and confessors, were deposited.

This word is also used by the Romanists for a desk in the church where the confessor takes the confessions of the penitents.

CONFESSOR, a Christian who has made a solemn and resolute profession of the faith, and has endured torments in its defence. A mere saint is called a confessor, to distinguish him from the roll of dignified saints; such as apostles, martyrs, &c. In ecclesiastical history, we frequently find the word confessors used for martyrs: in after-times, it was confined to those who, after having been tormented by the tyrants, were permitted to live and die in peace. And at last it was also used for those who, after having lived a good life, died under an opinion of sanctity. According to St Cyprian, he who presented himself to torture, or even to martyrdom, without being called to it, was not called a *confessor* but a *professor*: and if any out of a want of courage abandoned his country, and became a voluntary exile for the sake of the faith, he was called *exterris*.

CONFESSOR is also a priest, in the Romish church, who has a power to hear sinners in the sacrament of penance, and to give them absolution. The church calls him in Latin *confessarius*, to distinguish him from confessor, which is a name consecrated to saints. The confessors of the kings of France, from the time of Henry IV. have been constantly Jesuits: before him the Dominicans and Cordeliers shared the office between them. The confessors of the house of Austria have also, ordinarily, been Dominicans and Cordeliers; but the latter emperors have all taken Jesuits.

CONFIGURATION, the outward figure which bounds bodies, and gives them their external appearance; being that which, in a great measure, constitutes the specific difference between bodies.

CONFIRMATION, in a general sense, the act of ratifying or rendering a title, claim, report, or the like, more sure and indisputable.

CONFIRMATION, in law, a conveyance of an estate, or right in *esse*, from one man to another, whereby a voidable estate is made sure and unavoidable, or a particular estate is increased, or a possession made perfect.

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CONFIRMATION, in theology, the ceremony of laying on of hands, for the conveyance of the Holy Ghost.

The antiquity of this ceremony is, by all ancient writers, carried as high as the apostles, and founded upon their example and practice. In the primitive church, it used to be given to Christians immediately after baptism, if the bishop happened to be present at the solemnity. Among the Greeks, and throughout the East, it still accompanies baptism: but the Romanists make it a distinct independent sacrament. Seven years is the stated time for confirmation: however, they are sometimes confirmed before, and sometimes after, that age. The person to be confirmed has a god-father and god-mother appointed him, as in baptism. The order of confirmation in the church of England, does not determine the precise age of the persons to be confirmed.

CONFISCATION, in law, the adjudication of goods or effects to the public treasury; as the bodies and effects of criminals, traitors, &c.

CONFLAGRATION, the general burning of a city or other considerable place.

This word is commonly applied to that grand period or catastrophe of our world, when the face of nature is to be changed by fire, as formerly it was by water. The ancient Pythagoreans, Platonists, Epicureans, and Stoics, appear to have had a notion of the conflagration: though whence they should derive it, unless from the sacred books, is difficult to conceive; except, perhaps, from the Phœnicians, who themselves had it from the Jews. Seneca says expressly, *Tempus advenerit quo sidera sideribus incurrent, & omni flagrans materia uno igne, quicquid nunc ex deposito lucet, ardebit.* This general dissolution the Stoics call *εκπύρωση*, *ecpyrosis*. Mention of the conflagration is also made in the books of the Sybils, Sophocles, Hytaspes, Ovid, Lucan, &c. Dr Burnet, after F. Tachard and others, relates that the Siamese believe that the earth will at last be parched up with heat; the mountains melted down; the earth's whole surface reduced to a level, and then consumed with fire. And the Bramins of Siam do not only hold that the world shall be destroyed by fire; but also that a new earth shall be made out of the cinders of the old.

Various are the sentiments of authors on the subject of the conflagration; the cause whence it is to arise, and the effects it is to produce. Divines ordinarily account for it metaphysically: and will have it take its rise from a miracle, as a fire from heaven. Philosophers contend for its being produced from natural causes; and will have it effected according to the laws of mechanics. Some think an eruption of the central fire sufficient for the purpose; and add, that this may be occasioned several ways, viz. either by having its intension increased: which again, may be effected either by being driven into less space by the enroachments of the superficial cold, or by an increase of the inflammability of the fuel whereon it is fed; or by having the resistance of the imprisoning earth weakened; which may happen, either from the diminution of its matter, by the consumption of its central parts, or by weakening the cohesion of the constituent parts of the mass by the excess of the defect of moisture. Others look for the cause of the conflagration in the atmosphere; and suppose, that some of the

meteors there engendered in unusual quantities, and exploded with unusual vehemence, from the concurrence of various circumstances, may effect it, without seeking any further. The astrologers account for it from a conjunction of all the planets in the sign Cancer; as the deluge, say they, was occasioned by their conjunction in Capricorn. Lastly, others have recourse to a still more effectual and flaming machine, and conclude the world is to undergo its conflagration from the near approach of a comet in its return from the sun.

CONFLUENT, among physicians, &c. an appellation given to that kind of SMALL-POX wherein the pustules run into each other.

CONFLUENTES (anc. geog.), a place at the confluence of the Rhine and Moselle, supposed to be one of the 50 forts erected by Drusus on the Rhine, in Gallia Belgica: Now *Coblentz*, a town of Triers. E. Long. 7. 15. Lat. 50. 30.

CONFORMATION, the particular consistence and texture of the parts of any body, and their disposition to compose a whole.

CONFORMATION, in medicine, that make and construction of the human body which is peculiar to every individual. Hence, a *mala conformatio* signifies some fault in the first rudiments; whereby a person comes into the world crooked, or with some of the viscera or cavities unduly framed or proportioned. Many are subject to incurable asthmas, from a too small capacity of the thorax, and the like vitious conformations.

CONFORMITY, in the schools, is the congruency, or relation of agreement between one thing and another; as between the measure and the thing measured, the object and the understanding, the thing and the division thereof, &c.

CONFRONTATION, the act of bringing two persons in presence of each other, to discover the truth of some fact which they relate differently.

The word is chiefly used in criminal matters; where the witnesses are confronted with the accused, the accused with one another, or the witnesses with one another.

CONFUCIUS, a Chinese philosopher, who lived about 500 years before our Saviour's birth, in the kingdom of Lu, now called the province of *Xantung*. His wit and judgment got him a reputation from his very youth; and being a mandarin, and employed in the government of the kingdom of Lu, his profound knowledge of morals and politics made him be greatly admired. Notwithstanding his care, his prince's court was much disordered; and Confucius finding the king would not listen to his advice, quitted the court, and taught moral philosophy with such applause that he soon had above 3000 scholars, whereof 72 surpassed the rest in learning and virtue, for whom the Chinese have still a particular veneration. He divided his doctrine into four parts, and his scholars into four classes: the first order was of those who studied to acquire virtue; the 2d, those who learned the art of reasoning well; the 3d studied the government of the state and the duty of magistrates; the 4th were wholly taken up in noble discourses of all that concerned morals. In spite of all his pains to establish pure morality and religion, he was nevertheless the innocent cause of their corruption. It is said, that when

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Confusion. he was complimented upon the excellency of his philosophy, he replied, that he fell greatly short of the perfect degree of virtue: but that in the west the most holy was to be found. This made a strong impression on the learned; and in the 66th year after Christ's birth, the emperor Mon-ti sent ambassadors toward the west to seek this holy man. They stopped at an island near the Red Sea, and found a famous idol named Fohi, representing a philosopher that lived 500 years before Confucius. They carried this idol back with them, with instructions concerning the worship rendered to it; and so introduced a superstition that abolished in several places the maxims of Confucius. His tomb is in the academy where he taught, near the town Xio-fu, upon the banks of the river Xu. This philosopher has been in great veneration in China above 2000 years; and is still so esteemed, that each town has a palace consecrated to his memory. There was one of his descendants who was very considerable in the kingdom in 1646, whom Xanchi king of Tartary, who then conquered China, received with a great deal of honour. All those of his family are mandarins by birth: and have a privilege common with the princes of the blood, not to pay any tribute.

CONFUSION, in a general sense, is opposed to order, in a perturbation whereof confusion consists; *e. gr.* when things prior in nature do not precede, or posterior do not follow, &c.

In a logical sense, confusion is opposed to distinctness or perspicuity; and may happen either in words, as when misconstrued or misapplied; or in ideas, as when the idea of any thing presents something along with it, which does not properly belong to that thing. See IDEA and NOTION.

In a physical sense, confusion is a sort of union or mixture by mere contiguity. Such is that between fluids of contrary nature, as oil and vinegar, &c.

CONFUSION, in Scots law, is a method of suspending and extinguishing obligations. See LAW, Part III. N° clxxvi. 8.

CONFUSION of Tongues, in the history of mankind, is a memorable event, which happened in the one hundred and first year according to the Hebrew chronology, and the four hundred and first year by the Samaritan, after the flood, at the overthrow of Babel; and which was providentially brought about in order to facilitate the dispersion of mankind and the population of the earth. Until this period there had been one common language, which formed a bond of union that prevented the separation of mankind into distinct nations: and some have supposed, that the tower of Babel was erected as a kind of fortress, by which the people intended to defend themselves against that separation which Noah had projected.

There has been a considerable difference of opinion as to the nature of this confusion, and the manner in which it was effected. Some learned men, prepossessed with the notion that all the different idioms now in the world did at first arise from one original language to which they may be reduced, and that the variety among them is no more than must naturally have happened in a long course of time by the mere separation of the builders of Babel, have maintained, that there were no new languages formed at the confusion; but that this event was accomplished by creating a misun-

derstanding and variance among the builders without *Confusion*. any immediate influence on their language. But this opinion, advanced by Le Clerc, &c. seems to be directly contrary to the obvious meaning of the word *תבול*, *Shapba*, "lip," used by the sacred historian. Others have imagined, that this was brought about by a temporary confusion of their speech, or rather of their apprehensions, causing them, whilst they continued together and spoke the same language, to understand the words differently. Scaliger is of this opinion. Others, again, account for this event by the privation of all language, and by supposing that mankind were under a necessity of associating together, and of imposing new names on things by common consent. Another opinion ascribes the confusion to such an indistinct remembrance of the original language which they spoke before, as made them speak it very differently; so that by the various inflections, terminations, and pronunciations of divers dialects, they could no more understand one another, than they who understand Latin can understand those who speak French, Italian, or Spanish, though all these languages arise out of it. This opinion is adopted by Causabon, and by Bishop Patrick in his *Commentary in loc.* and is certainly much more probable than either of the former. And Mr Shuckford maintains, that the confusion arose from small beginnings, by the invention of new words in either of the three families of Shem, Ham, and Japhet, which might contribute to separate them from one another; and that in each family new differences of speech might gradually arise, so that each of these families went on to divide and subdivide among themselves. Others, again, as Mr Jos. Mede and Dr Wotton, &c. not satisfied with either of the foregoing methods of accounting for the diversity of languages among mankind, have recourse to an extraordinary interposition of divine power, by which new languages were framed and communicated to different families by a supernatural infusion or inspiration; which languages have been the roots and originals from which the several dialects that are, or have been, or will be spoken, as long as this earth shall last, have arisen, and to which they may with ease be reduced. As to the number of languages thus introduced, many opinions have been adopted. If there were no more than there were nations or heads of nations, then the number would be seven for Japhet, four for Ham, and five for Shem; but if there were as many as there were families, which is the more probable opinion, their number cannot be certainly assigned. However, the Hebrews fancy they were 70, because the descendants from the sons of Noah, enumerated Genesis x. were just so many. Allowing, then, the languages of the chief families to have been fundamentally different from each other, the sub-languages and dialects within each branch would probably have had a mutual affinity, greater or less as they settled nearer or farther from each other. But whichsoever of these hypotheses is adopted, the primary object of the confusion at Babel was the separation and dispersion of mankind.

Dr Bryant, in the third volume of his *Analysis of Ancient Mythology*, has advanced a singular hypothesis, both with respect to the confusion of tongues and the dispersion. He supposes that the confusion of language was local and partial, and limited to Babel only.

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By כָּל אֶרֶץ, Gen. xi. 1. and 8. which our translators render *the whole earth*, he understands *every region*: and by the same words in ver. 9. *the whole region* or province. This confusion was occasioned, as he supposes, by a labial failure; so that the people could not articulate. Thus their speech was confounded, but not altered; for, as soon as they separated, they recovered their true tenor of pronunciation, and the language of the earth continued for some ages nearly the same. The interviews between the Hebrews and other nations, recorded in Scripture, were conducted without an interpreter; and he farther observes, that the various languages which subsist at this day retain sufficient relation to show, that they were once dialects from the same matrix, and that their variety was the effect of time. See DISPERSION.

CONFUTATION, in rhetoric, &c. a part of an oration, wherein the orator seconds his own arguments and strengthens his cause, by refelling and destroying the opposite arguments of the antagonist. This is done by denying what is apparently false, by detecting some flaw in the reasoning of the adverse party, by granting their argument, and showing its invalidity, or retorting it upon the adversary.

CONGE', in the French law, a licence, or permission, granted by a superior to an inferior, which gives him a dispensation from some duty to which he was before obliged. A woman cannot obligate herself without the *conge* or licence of her husband; a monk cannot go out of his convent, without the *conge* of his superiors.

CONGE' *de lire*, in ecclesiastical policy, the king's permission royal to a dean and chapter in the time of a vacancy, to choose a bishop; or to an abbey, or priory, of his own foundation, to choose their abbot or prior.

The king of England, as sovereign patron of all archbishoprics, bishoprics, and other ecclesiastical benefices, had of ancient time free appointment of all ecclesiastical dignities, whensoever they chanced to be void; investing them first *per baculum & annulum*, and afterwards by his letters-patent; and in course of time he made the election over to others, under certain forms and limitations, as that they should at every vacation, before they choose, demand the king's *congé de lire*, and after the election crave his royal assent, &c.

CONGE', in architecture, a mould in form of a quarter round, or a cavetto, which serves to separate two members from one another; such as that which joins the shaft of the column to the cincture, called also *apophyge*.

CONGES are also rings or ferrels formerly used in the extremities of wooden pillars, to keep them from splitting, afterwards imitated in stone-work.

CONGELATION, signifies the passing of any body from a fluid to a solid state: so that the term is thus applicable to metals when they resume their solid form after being heated, to water when it freezes, to wax, spermaceti, &c. when they become solid after having been rendered fluid by heat; and in general to all processes, where the whole substance of the fluid is converted into a solid: but it differs from crystallization; because in the latter process, though the salt passes from a fluid to a solid state, a considerable

quantity of liquid is always left, so that the term *congelation* is never applied in this case.

The process of congelation in all cases depends upon, or at least is accompanied with, the emission of heat, as has been evinced by experiments made not only in water, but on spermaceti, wax, &c. for in all of these, tho' the thermometer immersed in them while fluid continued to descend gradually till a certain period, yet it was as constantly observed to remain stationary, or even to ascend while the congelation went on. The principle on which the phenomenon depend is thus ascertained; but why this heat should be emitted, is a question which has not yet been thoroughly investigated. Some conjectures relative to this are indeed mentioned in the article CHEMISTRY, when treating of elementary fire, though experiments are still to be wished for on the subject.

It is not known whether all kinds of fluids are naturally capable of congelation or not; though we are certain that there are very great differences among them in this respect. The most difficult of all those of which the congelation has been actually ascertained is quicksilver. This was long thought capable of resisting any degree of cold whatever; and it is only within a few years that its congelation by artificial means was known, and still more lately that some climates were found to be so severe as to congeal this fluid by the cold of the atmosphere.

The congelation of quicksilver was first ascertained by M. Joseph Adam Braun professor of philosophy at Petersburg. He had been employed in making thermometrical experiments, not with a view to make the discovery he actually did, but to see how many degrees of cold he could produce. An excellent opportunity for this occurred on the 14th of December 1759, when the mercury stood naturally at -34 , which is now known to be only five or six degrees above its point of congelation. Mr Braun, having determined to avail himself of this great degree of natural cold, prepared a freezing mixture of aquafortis and pounded ice, by means of which his thermometer was reduced to -69 . Part of the quicksilver had now really congealed; yet so far was M. Braun from entertaining any suspicion of the truth, that he had almost desisted from further attempts, being satisfied with having so far exceeded all the philosophers who went before him. Animated, however, by the hopes of producing a still greater degree of cold, he renewed the experiment; but having expended all his pounded ice, he was obliged to substitute snow in its place. With this fresh mixture the mercury sunk to -100 , 240 , and 352° . He then supposed that the thermometer was broken; but on taking it out to observe whether it was so or not, he found the quicksilver fixed, and continuing so for 12 minutes. On repeating the same experiment with another thermometer which had been graduated no lower than -220 , all the mercury sunk into the ball, and became solid as before, not beginning to reascend till after a still longer interval of time. Hence the professor concluded that the quicksilver was really frozen, and prepared for making a decisive experiment. This was accomplished on the 25th of the same month, and the bulb of the thermometer broken as soon as the metal was congealed. The mercury was now converted

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ed into a solid and shining metallic mass, which extended under the strokes of a pestle, in hardness rather inferior to lead, and yielding a dull sound like that metal. Professor Æpinus made similar experiments at the same time, employing both thermometers and tubes of a larger bore; in which last he remarked, that the quicksilver fell sensibly on being frozen, assuming a concave surface, and likewise that the congealed pieces sunk in fluid mercury.

The fact being thus established, and fluidity no longer to be considered as an essential property of quicksilver, Mr Braun communicated an account of his experiments to the Petersburg Academy, on the 6th of September 1760; of which a large extract was inserted in the Philosophical Transactions, vol. lii. p. 156. Five years afterwards he published another treatise on the same subject, under the title of Supplement to his former dissertation. In these he declared, that, since his former publication, he had never suffered any winter to elapse without repeating the experiment of congealing quicksilver, and never failed of success when the natural cold was of a sufficient strength for the purpose. This degree of natural cold he supposes to be -10° of Fahrenheit, though some commencement of the congelation might be perceived when the temperature of the air was as high as $+2^{\circ}$. The results of all his experiments were, that with the abovementioned frigorific mixtures, and once with rectified spirits and snow, when the natural cold was at -28° , he congealed the quicksilver, and discovered that it is a real metal which melts with a very small degree of heat. Not perceiving, however, the necessary consequence of its great contraction in freezing, he, in this work as well as in the former, confounded its point of congelation with that of its greatest contraction in freezing, and thus marked the former a great deal too low; though the point of congelation was very uncertain according to him, various difficulties having occurred to his attempts of finding the greatest point of contraction while freezing.

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Of Mr Blumenbach.

The experiments of M. Braun were not repeated by any person till the year 1774, when Mr John Frederic Blumenbach, then a student of physic at Gottingen, performed them to more advantage than it appears M. Braun had ever done. He was encouraged to make the attempt by the excessive cold of the winter that year. "I put (says he), at five in the evening of January 11th, three drachms of quicksilver into a small sugar-glass, and covered it with a mixture of snow and Egyptian sal-ammoniac. This mixture was put loose into the glass, so that the quicksilver lay perfectly free, being only covered with it as by pieces of ice: the whole, together with the glass, weighed somewhat above an ounce. It was hung out at a window in such a position as to expose it freely to the northwest; and two drachms more of sal-ammoniac mixed with the snow on which it stood. The snow and sal-ammoniac, in the open air, soon froze into a mass like ice; no sensible change, however, appeared in the quicksilver that evening; but at one in the morning it was found frozen solid. It had divided into two large and four smaller pieces: one of the former was hemispherical, the other cylindrical, each seemingly rather above a drachm in weight; the four small bits might amount to half a scruple. They were all with their flat side frozen hard to the glass, and no

where immediately touched by the mixture; their colour was a dull pale white with a bluish cast, like zinc, very different from the natural appearance of quicksilver. Next morning about seven o'clock I found that the larger hemisphere began to melt, perhaps because it was most exposed to the air, and not so near as the others to the sal-ammoniac mixture which lay beneath. In this state it resembled an amalgam, sinking to that side on which the glass was inclined; but without quitting the surface of the glass, to which it was yet firmly congealed: the five other pieces had not yet undergone any alteration, but remained frozen hard. Toward eight o'clock the cylindrical piece began to soften in the same manner, and the other four soon followed. About eight they fell from the surface of the glass, and divided into many fluid shining globules, which were soon lost in the interstices of the frozen mixture, and reunited in part at the bottom, being now exactly like common quicksilver." At the time this experiment was made, the thermometer stood at -10° in the open air.

The circumstances attending this experiment are still unaccountable; for, in the first place, the natural cold was scarcely sufficient, along with that of the artificial mixture, which produces 32° more, to have congealed the quicksilver; which yet appears to have been very effectually done by the length of time it continued solid. 2. It is not easy to account for the length of time required for congealing the quicksilver in this experiment, since other frigorific mixtures begin to act almost immediately; and, 3. There was not at last even the appearance of action, which consists in a solution of the snow, and not in its freezing into a mass. "The whole experiment (says Dr Blagden*) remains involved in such obscurity, that some persons have supposed the quicksilver itself was not frozen, but only covered over with ice; to which opinion, however, there are great objections. It is worthy of remark, that Gottingen, though situated in the same latitude as London, and enjoying a temperate climate in general, becomes subject at times to a great severity of cold. This of 11th of January 1774 is one instance: I find others there where the thermometer sunk to -12° , -16° , or -19° ; and at Cattlenburg, a small town about two German miles distant, to -30° . By watching such extraordinary occasions, experiments on the freezing of quicksilver, might easily be performed in many places, where the possibility of them is at present little suspected. The cold observed at Glasgow in 1780 would have been fully sufficient for that purpose."

In consequence of the publication of Mr Braun's Experiments, the Royal Society desired their late secretary Dr Maty to make the necessary application to the Hudson's Bay company, in order to repeat the experiment in that country. Mr Hutchins, who was then at London, and going out with a commission as governor of Albany Fort, offered to undertake the experiments, and executed them very completely, freezing quicksilver twice in the months of January and February 1775. The account of his success was read before the Royal Society at the commencement of the severest winter that had been known for many years in Europe; and at this time the experiment was repeated by two gentlemen of different countries. One was Dr Lambert Bicker, secretary to the Batavian society at Rotterdam; who on the 28th of January 1776, at eight

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eight in the morning, made an experiment to try how low he could bring the thermometer by artificial cold, the temperature of the atmosphere being then $+2^{\circ}$. He could not, however, bring it lower than -94° , at which point it stood immovable; and on breaking the thermometer, part of the quicksilver was found to have lost its fluidity, and was thickened to the consistence of an amalgam. It fell out of the tube in little bits, which bore to be flattened by pressure, without running into globules like the inner fluid part. The experiment was repeated next day, when the thermometer stood at $+8^{\circ}$, but the mercury would not then descend below -80° ; and as the thermometer was not broken, it could not be known whether the mercury had congealed or not. All that could be inferred from these experiments therefore was, that the congealing point of mercury was not below -94° of Fahrenheit's thermometer. The other who attempted the congelation of this fluid was the late Dr Anthony Fothergill; but it could not be determined whether he succeeded or not. An account of his experiment is inserted in the Philosophical Transactions, Vol. lxvi.

8
Point of
congelation deter-
mined by
Mr Hutch-
ins.

No other attempts were made to congeal quicksilver until the year 1781, when Mr Hutchins resumed the subject with great success, inasmuch that from his experiments the freezing point of mercury is now almost as well settled as that of water. Preceding philosophers, indeed, had not been altogether inattentive to this subject. Professor Braun himself had taken great pains to investigate it; but for want of paying the requisite attention to the difference betwixt the contraction of the fluid mercury by cold and that of the congealing metal by freezing, he could determine nothing certain concerning it. Others declared it as their opinion, that nothing certain could be determined by merely freezing mercury in a thermometer filled with that fluid. Mr Cavendish and Dr Black first suggested the proper method of obviating the difficulties on this subject. Dr Black, in a letter to Mr Hutchins, dated October 5. 1779, gave the following directions for making the experiment with accuracy: "Provide a few wide and short tubes of thin glass, sealed at one end and open at the other: the wideness of these tubes may be from half to three quarters of an inch, and the length of them about three inches. Put an inch or an inch and a half depth of mercury into one of these tubes, and plunging the bulb of the thermometer into the mercury, set the tube with the mercury and the thermometer in it into a freezing mixture, which should be made for this purpose in a common tumbler or water glass: and, *N. B.* in making a freezing mixture with snow and spirit of nitre, the quantity of the acid should never be so great as to dissolve the whole of the snow, but only enough to reduce it to the consistence of panada. When the mercury in the wide tube is thus set in the freezing mixture, it must be stirred gently and frequently with the bulb of the thermometer; and if the cold be sufficiently strong, it will congeal by becoming thick and *broafy* like an amalgam. As soon as this is observed, the thermometer should be examined without lifting it out of the congealing mercury; and I have no doubt that in every experiment thus made, with the same mercury, the instrument will always

9
Dr Black's
directions
for making
the experi-
ment.

point to the same degree, provided it has been made and graduated with accuracy."

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tion.

The apparatus recommended by Mr Cavendish, and which Mr Hutchins made use of, consisted of a small mercurial thermometer, the bulb of which reached about $2\frac{1}{2}$ inches below the scale, and was inclosed in a glass cylinder swelled at the bottom into a ball, which when used was filled with quicksilver, so that the bulb of the thermometer was entirely covered with it. If this cylinder be immersed in a freezing mixture till great part of the quicksilver in it is frozen, it is evident that the degree shown at that time by the inclosed thermometer is the precise point at which mercury freezes; for as in this case the ball of the thermometer must be surrounded for some time with quicksilver, part of which is actually frozen, it seems impossible that the thermometer should be sensibly above that point; and while any of the quicksilver in the cylinder remains fluid, it is impossible that it should sink sensibly below it. The diameter of the bulb of the thermometer was rather less than a quarter of an inch, that of the swelled part of the cylinder two-thirds; and as it was easy to keep the thermometer constantly in the middle of the cylinder, the thickness of quicksilver betwixt it and the glass could never be much less than the sixth part of an inch. The bulb of the thermometer was purposely made as small as it conveniently could, in order to leave a sufficient space between it and the cylinder, without making the swelled part larger than necessary, which would have caused more difficulty in freezing the mercury in it.

10
Apparatus
recom-
mended by
Mr Caven-
dish.

The first experiment with this apparatus was made on the 15th of December 1781; the thermometer had stood the evening before at -18° . A bottle of spiritus nitri fortis was put on the house-top, in order to cool it to the same temperature. The thermometers made use of had been hung up in the open air for three weeks, to compare their scales. On the morning of the experiment they were about 23° below 0.—In making it, the thermometer of the apparatus was suspended in the bulb of the cylinder by means of some red worsted wound about the upper part of its stem, to a sufficient thickness, to fill the upper part of its orifice; and a space of near half an inch was left empty between the quicksilver and worsted.

11
Accounts
of the ex-
periments.

The apparatus was placed in the open air, on the top of the fort, with only a few deer skins sewed together for a shelter; the snow lay 18 inches deep on the works, and the apparatus was stuck into the snow, in order to bring it the sooner to the temperature of the air. The instruments were afterwards placed in three fresh freezing mixtures, in hopes of being able by their means to produce a greater degree of cold, but without effect; nor was any greater cold produced by adding more spirit of nitre. The mercury, however, was very completely frozen, that in the thermometer descending to 448° . On plunging the mercury into the freezing mixture, it descended in less than one minute to 40° below 0.

The second experiment was made the day following; and the same quantity of quicksilver employed that had been used in the former. As too small a quantity of the freezing mixture, however, had been originally made, it was necessary to add more during the

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Congela-
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the operation of congelation; by which means the spirit of nitre, in pouring it upon the snow, sometimes touched the bulb of the thermometer, and instantly raised it much higher; nor did the mercury ever descend below 206° , which was not half as far as it had done the day before, though the temperature of the atmosphere had been this day at -34° before the commencement of the operation. That in the apparatus, however, sunk to -95° . The apparatus was taken out of the mixture for half a minute, in order to examine whether the mercury was perfectly congealed or not, and during that time it showed no sign of liquefaction.

The third experiment was made the same day, and with the freezing mixture used in the last. By it the point of congelation was determined to be not below 40° .

The fourth experiment was made January 7th 1782; and in it he observed, that the mercury in the apparatus thermometer, after standing at 42 and $41\frac{1}{2}$ for a considerable time, fell to 77, not gradually, but at once as a weight falls.

In the fifth experiment the weather was excessively severe, so that it ought to have frozen the metal in the open air; but this did not then happen.

At the time of making the sixth experiment, the quicksilver in the open air stood at 44 below 0; and Mr Hutchins resolved to make use of this opportunity to observe how far it was possible to make it descend by means of cold, observing the degrees at the same time with a spirit thermometer made by Nairne and Blount, with which he had been furnished by the royal society in 1774. In this, however, he did not succeed; for the mercury never fell below 438, nor the standard 48. It stood at $27\frac{1}{2}$ at the beginning of the experiment. The reason of this was supposed to be, that the atmosphere was too cold for making this kind of experiments, by reason of its freezing the thread of quicksilver in the stem of the thermometer, so that it became incapable of contraction along with that in the bulb. In other experiments, though the metal in the bulb became solid, yet that in the stem always remained fluid; and thus was enabled to subside to a great degree by the diminution of bulk in the solid mercury. That this was really the case, appeared from the quicksilver falling at once from -86 to -434 , when the cold of the freezing mixture diminished, and the temperature of the air becoming about the same time somewhat milder, melted the congealed part in the stem, which thus had liberty to descend to that point.

In this experiment, also, the mixtures were made in double quantity to those of the former; these being only in common tumblers, but the mixtures for this experiment in pint-basons. It was observed that they liquefied faster than in other experiments. He had usually made them of the consistence of pap; but though he added snow at different times, it had very little effect in augmenting the cold, but rather decreased it. The congealed pieces of metal fell to the bottom, as might naturally have been expected from its great contraction in becoming solid.

From this experiment Mr Hutchins concluded, that the nearer the temperature of the atmosphere approached to the congealing point of mercury (so that

a great degree of cold might be communicated to the bulb of a thermometer, and yet the quicksilver in the tube remain fluid), he might make the experiment of ascertaining the greatest contraction of mercury to more advantage. With this view, he made another experiment, when the temperature of some of his thermometers stood as low as -37° ; and after an hour's attendance he perceived the mercury had fallen to 1367; but the thermometer unluckily was broken, and its bulb thrown away with the mixture. Professor Braün had likewise observed, that his thermometers were always broken when the mercury descended below 600.

The eighth experiment was made with a view to try whether quicksilver would congeal when in contact with the freezing mixture. For this purpose, he did not use the apparatus provided for other experiments, but filled a gallipot made of flint stone (as being thinner than the common sort), containing about an ounce, half full of quicksilver, into which he inserted a mercurial thermometer, employing another as an index. Thus he hoped to determine exactly when the quicksilver was congealed, as he had free access to it at all times, which was not the case when it was inclosed in the cylindrical glass, the worsted wound round the tube of the thermometer to exclude the air being equally effectual in excluding any instrument from being introduced to touch the quicksilver. He then made a kind of skewer, with a flat blunt point, of dried cedar wood, on account of its lightness, which he found would remain in the gelatinous freezing mixture at any depth he chose; but, when inserted into the quicksilver, the great difference betwixt the specific gravity of it and that ponderous fluid, made it always rebound upward; and by the degree of resistance, he could always know whether it proceeded from fluid or solid metal. At this time, however, the experiment did not succeed; but, at another trial, having employed about $\frac{1}{4}$ ths of a pound of metal, and let it remain a considerable time immersed in the same mixture which had just now been supposed to fail, he found that part of it was congealed; and, on pouring off the fluid part, no less than two-thirds remained fixed at the bottom.

The last experiment which has been published concerning the congelation of quicksilver by means of snow is that of Mr Cavendish, and of which he gives an account in the Phil. Transact. Vol. lxxiii. p. 325. Here, speaking of the cold of freezing mixtures, he says, "There is the utmost reason to think that Mr Hutchins would have obtained a greater degree of cold by using a weaker nitrous acid than he did. I found (says he) by adding snow gradually to some of this acid, that the addition of a small quantity produced heat instead of cold; and it was not until so much was added as to increase the heat from 28 to 51° , that the addition of more snow began to produce cold; the quantity of snow required for this purpose being pretty exactly one quarter of the weight of the spirit of nitre, and the heat of the snow, and air of the room, as well as of the acid, being 28° . The reason of this is, that a great deal of heat is produced by mixing water with spirit of nitre; and the stronger the spirit is, the greater is the heat produced. Now it appears from this experiment, that before the acid was diluted,

Congela-
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The ther-
mometers
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extreme
cold.13
Mr Caven-
dish's ex-
periments.14
Heat some-
times pro-
duced by
adding
snow to
spirit of
nitre.

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tion.

luted, the heat produced by its union with the water formed from the melting snow, was greater than the cold produced by the same; and it was not until it was diluted by the addition of one quarter of its weight of that substance, that the cold, generated by the latter cause, began to exceed the heat generated by the former. From what has been said, it is evident, that a freezing mixture made with undiluted acid will not begin to generate cold until so much snow is dissolved as to increase its heat from 28 to 51°; so that no greater cold will be produced than would be obtained by mixing the diluted acid heated to 51° with snow of the heat of 28°. This method of adding snow gradually is much the best way I know of finding what strength it ought to be of, in order to produce the greatest effect possible. By means of this acid diluted in the above mentioned proportion, I froze quicksilver in the thermometer called G (A) by Mr Hutchins, on the 26th of February 1782. I did not indeed break the thermometer to examine the state of the quicksilver therein; for, as it sunk to -110°, it certainly must have been in part frozen; but immediately took it out, and put the spirit thermometer in its room, in order to find the cold of the mixture. It sunk only to -30°; but by making allowance of the spirit in the tube being not so cold as that in the ball, it appears, that if it had not been for this cause, it would have sunk to -35° (B); which is 6° below the point of freezing, and is within one degree of as great a cold as that produced by Mr Hutchins.

"In this experiment the thermometer G sunk very rapidly; and, as far as I could perceive, without stopping at any intermediate point till it came to the above mentioned degree of -110°, where it stuck. The materials used in making the mixture were previously cooled, by means of salt and snow, to near nothing; and the temperature of the air was between 20° and 25°; the quantity of acid used was 4½ oz.; and the glass in which the mixture was made, was surrounded with wool, and placed in a wooden box, to prevent its losing its cold so fast as it would otherwise have done. Some weeks before this I made a freezing mixture with some spirit of nitre much stronger than that used in the foregoing experiment, though not quite so strong as the undiluted acid, in which the cold was less intense by 4½°. It is true the temper of the air was much less cold, namely 35°, but the spirit of nitre was at least as cold, and the snow not much less so.

15
Of the cold
produced
by oil of vi-
triol and
snow.

"The cold produced by mixing oil of vitriol, properly diluted with snow, is not so great as that produced by spirit of nitre, though it does not differ from it by so much as 8°; for a freezing mixture, prepared with diluted oil of vitriol, whose specific gravity, at 60° of heat, was 1,5642, sunk in the thermometer G to -37°, the experiment being tried at the same time, and with the same precautions, as the foregoing. It was previously found, by adding snow gradually to some of this acid, as was done by the nitrous acid, that it was a little, but not much stronger, than it ought to be, in order to produce the greatest effect."

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The experiment made by Mr Walker, in which he congealed quicksilver by means of spirit of nitre and Glauber's salt, without any snow, concludes the history of the artificial congelation of mercury. See the article COLD. It now remains that we say something of the congelation of it by the natural cold of the atmosphere.

Congela-
tion.

Dr Blagden, from whose paper in the Philosophical Transactions, vol. lxxiii. this account is taken, observes, that it was not till near the year 1730 that thermometers were made with any degree of accuracy; and in four or five years after this, the first observations were made which prove the freezing of quicksilver. On the accession of the Empress Anne Ivanouna to the throne of Russia, three professors of the Imperial academy were chosen to explore and describe the different parts of her Asiatic dominions, and to inquire into the communication betwixt Asia and America. These were Dr John George Gmelin, in the department of natural history and chemistry; M. Gerard Frederic Muller, as general historiographer; and M. Louis de l'Isle de la Croyere, for the department of astronomy; draughtsmen and other proper assistants being appointed to attend them. They departed from Petersburg in 1733; and such as survived did not return till ten years after. The thermometrical observations were communicated by Professor Gmelin, who first published them in his *Flora Sibirica*, and afterwards more fully in the *Journal of his Travels*. An abstract of them was likewise inserted in the *Petersburg Commentaries* for the years 1756 and 1765, taken, after the professor's death, from his original dispatches in possession of the Imperial academy.

16
Congela-
tion of
quicksilver
by natural
cold.

In the winter of 1734 and 1735, Mr Gmelin being at Yeneseisk in 58½° N. Lat. and 92° E. Long. from Greenwich, first observed such a descent of the mercury, as we know must have been attended with congelation. "Here (says he) we first experienced the truth of what various travellers have related with respect to the extreme cold of Siberia; for, about the middle of December, such severe weather set in, as we were sure had never been known in our time at Petersburg. The air seemed as if it were frozen, with the appearance of a fog, which did not suffer the smoke to ascend as it issued from the chimnies. Birds fell down out of the air as dead, and froze immediately, unless they were brought into a warm room. Whenever the door was opened, a fog suddenly formed round it. During the day, short as it was, parhelia and haloes round the sun were frequently seen; and in the night mock moons, and haloes about the moon. Finally, our thermometer, not subject to the same deception as the senses, left us no doubt of the excessive cold; for the quicksilver in it was reduced, on the 5th of January O. S. to -120° of Fahrenheit's scale, lower than it had ever hitherto been observed in nature."

17
Excessive
cold of Si-
beria.

The next instance of congelation happened at Yakutsk, in N. Lat. 62. and E. Long. 130. The weather here was unusually mild for the climate, yet the

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(A) This was a small mercurial thermometer, made by Nairne and Blount, on an ivory scale, divided at every five degrees, and reaching from 215° above to 250° below the cypher.

(B) This is to be understood of a spirit thermometer, whose -29° = 40° of Fahrenheit's mercurial.

Congela-
tion.

thermometer fell to -72° ; and one person informed the professor by a note, that the mercury in his barometer was frozen. He hastened immediately to his house to behold such a surprising phenomenon; but though he was witness to the fact, the prejudice he entertained against the possibility of the congelation, would not allow him to believe it. "Not feeling (says he), by the way, the same effects of cold as I had experienced at other times in less distances, I began, before my arrival, to entertain suspicions about the congelation of his quicksilver. In fact, I saw that it did not continue in one column, but was divided in different places as into little cylinders, which appeared frozen; and, in some of these divisions between the quicksilver, I perceived like the appearance of frozen moisture. It immediately occurred to me, that the mercury might have been cleaned with vinegar and salt, and not sufficiently dried. The person acknowledged it had been purified in that manner. This same quicksilver, taken out of the barometer, and well dried, would not freeze again, though exposed to a much greater degree of cold, as shown by the thermometer."

Another set of observations, in the course of which the mercury frequently congealed, were made by Professor Gmelin at Kirenga fort, in $57\frac{1}{2}^{\circ}$ N. Lat. 108° E. Long.; his thermometer, at different times, standing at -108° , -86° , -100° , -113° , and many other intermediate degrees. This happened in the winter of 1737 and 1738. On the 27th of November, after the thermometer had been standing for two days at -46° , he found it sunk at noon to 108° . Suspecting some mistake, after he had noted down the observation, he instantly ran back, and found it at 102° ; but ascending with such rapidity, that in the space of half an hour it had risen to -19° . This phenomenon, which appeared so surprising, undoubtedly depended on the expansion of the mercury frozen in the bulb of the thermometer, and which now melting, forced upwards the small thread in the stem.

A similar appearance was observed at the same fort a few days after; and on the 29th of December, O. S. he found the mercury, which had been standing at -40° in the morning, sunk to -100° at four in the afternoon. At this time, he says, he "saw some air in the thermometer separating the quicksilver for the space of about six degrees." He had taken notice of a similar appearance the preceding evening, excepting that the air, as he supposed it to be, was not then collected into one place, but lay scattered in several.

These appearances undoubtedly proceeded from a congelation of the mercury, though the prejudice entertained against the possibility of this phenomenon would not allow the professor even to inquire into it at all. Several other observations were made; some of which were lost, and the rest contain no farther information.

The second instance where a natural congelation of mercury has certainly been observed, is recorded in the Transactions of the Royal Academy of Sciences at Stockholm. The weather, in January 1760, was remarkably cold in Lapland; so that, on the 5th of that month, the thermometers fell to -76° , -128° , or lower; on the 23d and following days they fell to -58° , -79° , -92° , and below -238° entirely into the ball. This was observed at Tornea, Sombio, Ja-

kasiers, and Utsioki, four places in Lapland, situated between the 65th and 78th degrees of N. Lat. and the 21st and 28th of E. Long. The person who observed them was M. Andrew Hellant, who makes the following remarks, of themselves sufficient to show that the quicksilver was frozen. "During the cold weather at Sombio (says he), as it was clear sunshine, though scarcely the whole body of the sun appeared above the low woods that covered our horizon, I took a thermometer which was hanging before in the shade, and exposed it to the rising sun about eleven in the forenoon, to see whether, when that luminary was so low, it would have any effect upon the instrument. But to my great surprise, upon looking at it about noon, I found that the mercury had entirely subsided into the ball, though it was standing as high as -61° at 11 o'clock, and the scale reached down to 238° below 0." On bringing the instrument near a fire, it presently rose to its usual height; and the reason of its subsiding before was its being somewhat warmed by the rays of the sun; which, feeble as they were, had yet sufficient power to melt the small thread of congealed mercury in the stem of the thermometer, and allow it to subside along with the rest. Mr Hellant, however, so little understood the reason of this phenomenon, that he frequently attempted to repeat it by bringing the thermometer near a fire, when the cold was only a few degrees below the freezing point of water, but could never succeed until it fell to -58° , or lower, that is, until the cold was sufficiently intense to congeal the metal. The only seeming difficulty in his whole account is, that when the mercury had subsided entirely into the ball of the thermometer, a vacuum or empty spot appeared, which run round the cavity like an air bubble, on turning the instrument; but this proceeded from a partial liquefaction of the mercury, which must necessarily melt first on the outside, and thus exhibit the appearance just mentioned.

The most remarkable congelation of mercury, which has ever yet been observed, was that related by Dr Peter Simon Pallas, who had been sent by the Empress of Russia, with some other gentlemen, on an expedition similar to that of Dr Gmelin. He did not, however, spend the winters in which he was in Siberia in the coldest parts of that country; that is about the middle of the northern part. Twice indeed he resided at Krasnoyarsk, in N. Lat. $56\frac{1}{2}^{\circ}$, E. Long. 93° ; where, in the year 1772, he had an opportunity of observing the phenomenon we speak of. "The winter (says he) set in early this year, and was felt with uncommon severity in December. On the 6th and 7th of that month happened the greatest cold I have ever experienced in Siberia; the air was calm at the time, and seemingly thickened; so that, though the sky was in other respects clear, the sun appeared as through a fog. I had only one small thermometer left, in which the scale went no lower than -7° ; and on the 6th in the morning, I remarked that the quicksilver in it sunk into the ball, except some small columns which stuck fast in the tube.—When the ball of the thermometer, as it hung in the open air, was warmed by being touched with the finger, the quicksilver rose; and it could plainly be seen, that the solid columns stuck and resisted a good while, and were at length pushed upward with a sort of violence. In the mean time

Congela-
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Remark-
able experi-
ments of
Dr Pallas.

Congela-
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time I placed upon the gallery, on the north side of my house, about a quarter of a pound of clean and dry quicksilver in an open bowl. Within an hour I found the edges and surface of it frozen solid, and some minutes afterwards the whole was condensed by the natural cold into a soft mass very much like tin. While the inner part was still fluid, the frozen surface exhibited a great variety of branched wrinkles; but in general it remained pretty smooth in freezing, as did also a larger quantity which I afterwards exposed to the cold. The congealed mercury was more flexible than lead; but on being bent short, it was found more brittle than tin; and when hammered out thin, it seemed somewhat granulated. If the hammer had not been perfectly cooled, the quicksilver melted away under it in drops; and the same thing happened when the metal was touched with the finger, by which also the finger was immediately benumbed. In our warm room it thawed on its surface gradually, by drops, like wax on the fire, and did not melt all at once. When the frozen mass was broken to pieces in the cold, the fragments adhered to each other and to the bowl on which they lay. Although the frost seemed to abate a little towards night, yet the congealed quicksilver remained unaltered, and the experiment with the thermometer could still be repeated. On the 7th of December, I had an opportunity of making the same observations all day; but some hours after sunset, a north-west wind sprung up, which raised the thermometer to -46° , when the mass of quicksilver began to melt."

19
Von Elter-
lein's expe-
riment.

In the beginning of the year 1780 M. Von Elterlein, of Vytegra, a town of Russia, in Lat. 61. E. Long. 36. froze quicksilver by natural cold; of which he gives the following account. "On the 4th of January 1780, the cold having increased to -34° that evening at Vytegra, I exposed to the open air three ounces of very pure quicksilver in a china tea-cup, covered with paper, pierced full of holes. Next day, at eight in the morning, I found it solid, and looking like a piece of cast lead, with a considerable depression in the middle. On attempting to loosen it in the cup, my knife raised shavings from it as if it had been lead, which remained sticking up; and at length the metal separated from the bottom of the cup in one mass. I then took it in my hand to try if it would bend: it was stiff like glue, and broke into two pieces; but my fingers immediately lost all feeling, and could scarcely be restored in an hour and an half by rubbing with snow. At eight o'clock a thermometer, made by Mr Lexmann of the Academy, stood at -57° ; by half after nine it was risen to -40° ; and then the two pieces of mercury which lay in the cup had lost so much of their hardness, that they could no longer be broken, or cut into shavings, but resembled a thick amalgam, which, though it became fluid when pressed by the fingers, immediately afterwards resumed the consistence of pap. With the thermometer at -39° , the quicksilver became fluid. The cold was never less on the 5th than -28° , and by nine in the evening it had increased again to -33° ."

An instance of the natural congelation of quicksilver also occurred in Jemtland, one of the provinces of Sweden, on the 1st of January 1782; and lastly, on the 26th of the same month, Mr Hutchins observed the same effect of the cold at Hudson's bay. "The

subject of this curious phenomenon (says he), was quicksilver put into a common two-ounce vial, and corked. The vial was about a third part full, and had constantly been standing by the thermometer for a month past. At eight o'clock this morning I observed it was frozen rather more than a quarter of an inch thick round the sides and bottom of the vial, the middle part continuing fluid. As this was a certain method of finding the point of congelation, I introduced a mercurial and a spirit thermometer into the fluid part, after breaking off the top of the vial, and they rose directly and became stationary; the former at 40° or $40\frac{1}{2}^{\circ}$, the latter at $29\frac{1}{2}^{\circ}$, both below the cypher. Having taken these out, I put in two others, G a mercurial one formerly described, and a spirit thermometer; the former of which became stationary at 40 and the latter at 30° . I then decanted the fluid quicksilver, to examine the internal surface of the frozen metal; which proved very uneven, with many radii going across, some of which resembled pin-heads. Urgent business called me away an hour. On my return I found a small portion only had liquefied in my absence. I then broke the vial entirely, and with a hammer repeatedly struck the quicksilver. It beat out flat, yielded a deadish sound, and became fluid in less than a minute afterwards.—It may be worth remarking, that the quicksilver in one of the thermometers, which had sunk to very near 500, and was then at 444, very readily run up and down the tube by elevating either end of the instrument."

These are all the well authenticated accounts of the congelation of mercury by the natural cold of the atmosphere. Some others have been published; but being either less important, or not so well authenticated, we forbear to mention them. A very considerable confirmation is obtained from the above history, of the theory of congelation delivered by Dr Black, and which is fully explained under the article CHEMISTRY. On Mr Hutchins's experiments, and on congelation in general, Mr Cavendish makes many valuable remarks; the substance of which is as follows:

"If a vessel of water, with a thermometer in it, be exposed to the cold, the thermometer will sink several degrees below the freezing point, especially if the water be covered up so as to be defended from the wind, and care taken not to agitate it; and then in dropping in a bit of ice, or on mere agitation, spiculæ of ice shoot suddenly through the water, and the inclosed thermometer rises quickly to the freezing point, where it remains stationary." In a note he says, that though in conformity to the common opinion he has allowed that "mere agitation may set the water a freezing, yet some experiments lately made by Dr Blagden seem to show, that it has not much, if any, effect of that kind, otherwise than by bringing the water in contact with some substance colder than itself. Though in general also the ice shoots rapidly, and the inclosed thermometer rises very quick; yet he once observed it to rise very slowly, taking up not less than half a minute, before it ascended to the freezing point; but in this experiment the water was cooled not more than one or two degrees below freezing; and it should seem, that the more the water is cooled below the freezing point, the more rapidly the ice shoots and the inclosed thermometer rises."

R r 2

Mr

Congela-
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20
Experi-
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Hutchins.

21
Mr Caven-
dish's re-
marks on
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Congela-
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Mr Cavendish then observes, "that from the foregoing experiments we learn that water is capable of being cooled considerably below the freezing point, without any congelation taking place; and that, as soon as by any means a small part of it is made to freeze, the ice spreads rapidly through the whole of the water. The cause of this rise of the thermometer is, that all, or almost all bodies, by changing from a fluid to a solid state, or from the state of an elastic to that of an unelastic fluid, generate heat; and that cold is produced by the contrary process. Thus all the circumstances of the phenomenon may be perfectly well explained; for, as soon as any part of the water freezes, heat will be generated thereby in consequence of the above-mentioned law, so that the new formed ice and remaining water will be warmed, and must continue to receive heat by the freezing of fresh portions of water, till it is heated exactly to the freezing point, unless the water could become quite solid before a sufficient quantity of heat was generated to raise it to that point, which is not the case: and it is evident, that it cannot be heated above the freezing point; for as soon as it comes thereto, no more water will freeze, and consequently no more heat will be generated.—The reason why the ice spreads all over the water, instead of forming a solid lump in one part, is, that, as soon as any small portion of ice is formed, the water in contact with it will be so much warmed as to be prevented from freezing, but the water at a little distance from it will still be below the freezing point, and will consequently begin to freeze.

"Were it not for this generation of heat, the whole of any quantity of water would freeze as soon as the process of congelation began; and in like manner the cold is generated by the melting of ice; which is the cause of the long time required to thaw ice and snow. It was formerly found that, by adding snow to warm water, and stirring it about until all was melted, the water was as much cooled as it would have been by the addition of the same quantity of water rather more than 150° degrees colder than the snow; or, in other words, somewhat more than 150° of cold are generated by the thawing of the snow; and there is great reason to believe that just as much heat is produced by the freezing of water. The cold generated in the experiment just mentioned was the same whether ice or snow was used.

22
On metals
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turn solid.

"A thermometer kept in melted tin or lead till they become solid, remains perfectly stationary from the time the metal begins to harden round the sides of the pot till it is entirely solid; but it cannot be perceived at all to sink below that point, and rise up to it when the metal begins to harden. It is not unlikely, however, that the great difference of heat between the air and melted metal might prevent this effect from taking place; so that though it was not perceived in these experiments, it is not unlikely that those metals, as well as water and quicksilver, may bear being cool-

ed a little below the freezing or hardening point (for the hardening of melted metals, and freezing of water, seems exactly the same process), without beginning to lose their fluidity.

Congela-
tion.

"The experiments of Mr Hutchins prove, that quicksilver contracts or diminishes in bulk by freezing; and that the very low degrees to which the thermometers have been made to sink, is owing to this contraction, and not to the cold having been in any degree equal to that shown by the thermometer. In the fourth experiment, one of the thermometers sunk to 450°, though it appeared, by the spirit thermometers, that the cold of the mixture was not more than five or six degrees below the point of freezing quicksilver. In the first experiment also, it sunk to 448°, at a time when the cold of the mixture was only 2½° below that point; so that it appears, that the contraction of quicksilver by freezing must be at least equal to its expansion by 404 degrees of heat (A). This, however, is not the whole contraction that it suffers; for it appears by an extract from a meteorological journal kept by Mr Hutchins at Albany fort, that his thermometer once sunk to 490° below 0; though it was known by a spirit thermometer, that the cold scarcely exceeded the point of freezing quicksilver. There are two experiments also of Professor Braun, in which the thermometer sunk to 544 and 556° below nothing; which is the greatest descent he ever observed without the ball being cracked. It is not indeed known how cold his mixtures were; but from Mr Hutchins's experiments, there is great reason to think they could not be many degrees below 40°. If so, the contraction which quicksilver suffers in freezing, is not much less than its expansion by 500° or 510° of heat, that is, almost $\frac{1}{8}$ of its whole bulk; and in all probability is never much more than that, though it is probable that this contraction is not always determinate: for a considerable variation may frequently be observed in the specific gravity of the same piece of metal cast different times over; and almost all cast metals become heavier by hammering. Mr Cavendish observed, that on casting the same piece of tin three times over, its density varied from 7.252 to 7.294, though there was great reason to think that no hollows were left in it, and that only a small part of this difference could proceed from the error of the experiment. This variation of density is as much as is produced in quicksilver by an alteration of 66° of heat; and it is not unlikely, that the descent of a thermometer, on account of the contraction of the quicksilver in its ball by freezing, may vary as much in different trials, though the whole mass of quicksilver is frozen without any vacuities.

23
Variation
of the den-
sity of me-
tals by tre-
quent cast-
ing.

"The cold produced by mixing spirit of nitre with snow is entirely owing to the melting of the snow. Now, in all probability, there is a certain degree of cold in which the spirit of nitre, so far from dissolving snow, will yield part of its own water, and suf-

24
Of freezing
mixtures.

(A) "The numbers here given are those shown by the thermometer without any correction; but if a proper allowance is made for the error of that instrument, it will appear, that the true contraction was 25° less than here set down; and from the manner in which thermometers have been usually adjusted, it is likely that in the 5th experiment of Mr Hutchins, as well as in those of Professor Braun, the true contraction might equally fall short of that by observation."

Congela-
tion.

suffer that to freeze, as is the case with solutions of common salt; so that if the cold of the materials before mixing is equal to this, no additional cold can be produced. If the cold of the materials is less, some increase of cold will be produced; but the total cold will be less than in the former case, since the additional cold cannot be generated without some of the snow being dissolved, and thereby weakening the acid, and making it less able to dissolve more snow; but yet the less the cold of the materials is, the greater will be the additional cold produced. This is conformable to Mr Hutchins's experiments; for in the fifth experiment, in which the cold of the materials was -40° , the additional cold produced was only 5° . In the first experiment, in which the cold of the materials was only -23° , an addition of at least 19° of cold was obtained; and by mixing some of the same spirit of nitre with snow in this climate, when the heat of the materials was $+26^{\circ}$, Mr Cavendish was able to sink the thermometer to -29° , so that an addition of 55 degrees of cold was produced.

"It is remarkable that in none of Mr Hutchins's experiments the cold of the mixture was more than 6° of the spirit thermometer below the freezing point of quicksilver, which is so little, that it might incline one to think that the spirit of nitre used by him was weak. This, however, was not the case; as its specific gravity at 58° of heat was 1.4923. It was able to dissolve $\frac{1}{1.42}$ its weight of marble, and contained

very little mixture of the vitriolic or marine acid: as well as could be judged from an examination of it, it was as little phlogisticated as acid of that strength usually is."

25
Congela-
tion of oil
of vitriol.

Acids, especially those of the mineral kind, powerfully resist congelation. There is, however, a peculiarity with regard to that of vitriol. Mr Chaptal, a foreign chemist, observed that it condensed by the cold of the atmosphere, and the crystals began to melt only at $+70^{\circ}$ of his thermometer; which, if Reaumur's, corresponds to about 47° of Fahrenheit. The crystals were unctuous from the melting acid, and they felt warmer than the neighbouring bodies: the form was that of a prism of six sides, flattened and terminated by a pyramid of six sides; but the pyramid appeared on one end only; on the other, the crystal was lost in the general mass. The pyramid resulted from an assemblage of six isosceles triangles: the oil when the crystal was melted was of a yellowish black; on redistilling it in a proper apparatus, no peculiar gas came over. M. Chaptal repeated his experiments with the highly concentrated acid, but found that it did not freeze; that the density of the acid which he thought froze most easily was to the oil, of the usual strength for sale, as from 63 and 65 to 66; and the necessary degree of cold about 19 of Fahrenheit. Oil of vitriol once melted will not crystallize again with the same degree of cold.

M. Moré, a considerable manufacturer of oil of vitriol at Hadimont near Vervier, in the duchy of Limbourg in Germany, attributes this congelation to the addition of nitrous air. The acid of vitriol is usually separated from sulphur by burning it in close vessels; and the air is supplied by adding to the sulphur a little nitre. He found, that by mixing the acid, ca-

pable of being congealed, with water or employing it for other purposes, orange-coloured fumes, and the smell of the true nitrous acid, were very evident. When this gas was destroyed, no degree of cold would congeal the acid, whatever was its degree of concentration; and the congelation was generally observed immediately after the process by which the acid was obtained.

Mr Macquer relates, in the second edition of his Chemical Dictionary, article *Vitriolic Acid*, that the Duke d'Ayen had observed the congelation of concentrated vitriolic acid, which had been exposed to a cold expressed by 13 or 14 degrees below 0 on Reaumur's thermometer; but that mixtures, consisting of one part of the above mentioned concentrated acid, with two or more parts of water, could not be frozen by the cold to which he exposed them, till he had diluted the acid so much that its density was to that of water as $104\frac{1}{2}$ to 96; in which latter case of congelation it is probable that the water only was frozen, as is the case in dilute solutions of salts. Similar experiments were made by M. de Morveau, and with equal success. Having produced an intense cold by pouring spirit of nitre on pounded ice, he congealed a part of some vitriolic acid which had been previously concentrated; but he observed, that though a very intense cold had been made use of to congeal the acid at first, it nevertheless remained congealed in much smaller degrees of cold, and that it thawed very slowly. This coincides with the observations of M. Chaptal; though the latter observes, that there is some difference between strong oil of vitriol lowered with water, and that produced of a given strength by rectification. The latter always has some colour; and it will not dissolve indigo in such a manner as to carry the colour into the stuff, though the stronger oil, diluted to the same degree, succeeds very well. Some observations were also made by Mr M'Nab at Hudson's Bay, an account of which is given in the Phil. Trans. for 1786 by Mr Cavendish, at whose desire they had been made. From them it appears, that vitriolic acid, whose specific gravity was to that of water as 1843 to 1000, froze when exposed to a cold of -15° of Fahrenheit's scale: that another more dilute vitriolic acid, consisting of 629 parts of the former concentrated acid, and 351 parts of water, congealed in a temperature of -36° ; and that, when farther diluted, it was capable of sustaining a much greater degree of cold without freezing at all. In these experiments, as well as in those of M. Morveau, it appeared, that the whole of the acid did not congeal, but that part of it retained its fluidity; and on examining the strength of that which remained fluid, Mr Cavendish found that there was very little difference between it and the other; whence he was led to suppose, that the reason of this congelation does not arise from any difference in strength, but on some less obvious quality, and such as constitutes the difference between common and icy oil of vitriol.

In all the experiments hitherto made, however, Mr Cavendish had found some uncertainty in determining the point of easiest freezing; neither could he determine whether the cold necessary for congelation does not increase without any limitation in proportion to the strength of the acid. A new set of experiments

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26
Mr Keir's
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were therefore made by Mr Keir to determine this point. He had observed, after a severe frost at the end of the year 1784 and beginning of 1785, that some vitriolic acid, contained in a corked phial, had congealed, while other bottles containing the same, some stronger and some weaker, retained their fluidity. As the congelation was naturally imputed to the extremity of the cold, he was afterwards surprised to find, when the frost ceased, that the acid remained congealed for many days, when the temperature of the atmosphere was sometimes above 40° of Fahrenheit; and when the congealed acid was brought into a warm room on purpose to thaw it, a thermometer placed in contact with it during its thawing continued stationary at 45° . Hence he concluded, that the freezing and thawing point of this acid was nearly at 45° ; and accordingly, on exposing the liquor which had been thawed to the air at the temperature of 30° , the congelation again took place in a few hours. From the circumstance of other parcels of the same acid, but of different strengths, remaining fluid, though they had been exposed to a much greater degree of cold, he was led to believe that there must be some certain strength at which the acid is more disposed to congeal than at any other. The specific gravity of the acid which had frozen was to that of water nearly as 1800 to 1000, and that of the stronger acid which had not frozen was as 1846 to 1000, which is the common density of that usually sold in England; and there was not the least difference, excepting in point of strength, between the acid which had frozen and that which had not; Mr Keir having taken the acid some weeks before with his own hands from the bottle which contained the latter, and diluted it with water, till it became of the specific gravity of 1800.

To render the experiment complete, Mr Keir immersed several acids of different strengths in melting snow, instead of exposing them to the air; the temperature of which was variable, whereas that of melting snow was certain and invariable. Those which would not freeze in melting snow were afterwards immersed in a mixture of common salt, snow, and water; the temperature of which, though not so constant and determinate as that of melting snow, generally remained for several hours at 18° , and was sometimes several degrees lower. The intention of adding water to the snow and salt was to lessen the intensity of the cold of this mixture, and to render it more permanent than if the snow and salt alone were mixed. The acids which had frozen in melting snow were five in number; which being thawed and brought to the temperature of 60° , were found on examination to have the following specific gravities, viz. 1786, 1784, 1780, 1778, 1775. Those which had not congealed with the melting snow, but which did so with the mixture of snow, salt, and water, were found, when brought to the temperature of 60° , to be of the following specific gravities, viz. 1814, 1810, 1804, 1794, 1790, 1770, 1759, 1750. Those which remained, and would freeze neither in melting snow nor in the mixture of snow, salt, and water, were of the gravities 1846, 1839, 1815, 1745, 1720, 1700, 1610, 1551. From the first of these it appears, that the medium density of the acids which froze with the na-

tural cold was 1780; and from the second, that at the densities of 1790 and 1770 the acid had been incapable of freezing with that degree of cold. Hence it follows, that 1780 is nearly the degree of strength of easiest freezing, and that an increase or diminution of that density equal to $\frac{1}{7}$ th of the whole, renders the acid incapable of freezing with the cold of melting snow, though this cold is something above the freezing point of the most congealable acid. From the second it appears, that by applying a more intense cold, viz. that produced by a mixture of snow, salt, and water, the limits of the densities of acids capable of congelation were extended to about $\frac{1}{7}$ th above or below the point of easiest freezing: and there seems little reason to doubt, that, by greater augmentations of cold, these limits may be further extended; but in what ratio these augmentations and extensions proceed, cannot be determined, without many observations made in different temperatures.

"But (says Mr Keir) though it is probable that the most concentrated acids may be frozen, provided the cold be sufficiently intense, yet there seems reason to believe, that some of the congelations which have been observed in highly concentrated acids, have been effected in consequence of the density of these acids being reduced nearly to the point of easy freezing by their having absorbed moisture from the air: for the Duke d'Ayen and M. de Morveau exposed their acids to the air in cups or open vessels; and the latter even acquaints us, that on examining the specific gravity of the acid which had frozen, he found it to that of water as 129 to 74; which density being less than that of easiest freezing, proves that the acid he employed, and which he had previously concentrated, had been actually weakened during the experiment. I have several times exposed concentrated oil of vitriol in open vessels in frosty weather; and I have sometimes, but not always, observed a congelation to take place. Upon separating the congealed part, and on examining the specific gravity of the latter after it had thawed, I found that it had been reduced to the point of easiest freezing. When the congealed acid was kept longer exposed it gradually thawed, even when the cold of the air increased; the reason of which is not to be imputed to the heat produced by the moisture of the air mixing with the acid, put principally to the diminution below the point of easiest freezing, which was occasioned by the continued absorption of moisture from the air, and which rendered the acid incapable of continuing frozen without a great increase of cold.

"It appears, then, that the concentration of M. de Morveau's acid, at the time of its congelation, from which circumstance Mr Cavendish infers generally that the vitriolic acid freezes more easily as it is more dense, is not a true premise; and that therefore the inference, though justly deduced, is invalid. On the contrary, there seems every reason to believe, that as the density of the acids increases beyond the point of easiest freezing, the facility of the congelation diminishes; at least to as great density as we have ever been able to obtain the vitriolic acid: for if it were possible to divest it entirely of water, it would probably assume a solid form in any temperature of the air.

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"The crystallization of the vitriolic acid is more or less distinct, according to the slowness of the formation of the crystals and other favourable circumstances. Sometimes they are very large, distinctly shaped, and hard. Their shape is like those of the common mineral alkali and selenite spar, but with angles different in dimensions from either of these. They are solid, consisting of ten faces; of which the two largest are equal, parallel, and opposite to each other; and are oblique-angled parallelograms or rhomboids, whose angles are, as near as could be measured, of 105 and 75 degrees. Between these two rhomboidal faces are placed eight of the form of trapeziums; and thus each crystal may be supposed to be compounded of two equal and similar frustums of pyramids joined together by their rhomboidal bases. They always sunk in the fluid acid to the bottom of the vessel, which showed that their density was increased by congelation. It was attempted to determine their specific gravity by adding to this fluid some concentrated acid, which should make them float in the liquor, the examination of whose specific gravity should ascertain that of the floating crystals; but they were found to sink even in the most concentrated acid, and were consequently denser. Some of the congealable acid previously brought to the freezing temperature was then poured into a graduated narrow cylindrical glass, up to a certain mark, which indicated a space equal to that occupied by 200 grains of water. The glass was placed in a mixture of snow, salt, and water; and when the acid was frozen, a mark was made on the part of the glass to which it had sunk. Having thawed the acid and emptied the glass, it was filled with water to the mark to which it had sunk by freezing; and it was then found that 15 grains more of water were required to raise it to the mark expressing 200 grains; which shows, that the diminution of bulk sustained by the acid in freezing had been equal to $\frac{1}{13.3}$ of the whole. Computing from

this datum, we should estimate the specific gravity of the congealed acid to have been 1924; but as it evidently contained a great number of bubbles, its real specific gravity must have been considerably greater than the above calculation, and cannot easily be determined on account of these bubbles. By way of comparison, Mr Keir observed the alteration of bulk which water contained in the same cylindrical vessel would suffer by freezing; and found that its expansion was equal to about $\frac{1}{10}$ th of its bulk. The water had been previously boiled, but nevertheless contained a great number of air bubbles; so that in this respect there is a considerable difference between the congelations of water and the vitriolic acid; though perhaps it may arise principally from the bubbles of elastic fluid being in greater proportion in the one than the other.

"Greater cold is produced by mixing snow or pounded ice with the congealed than with the fluid vitriolic acid, though the quantity is not yet determined. The greatest cold produced by Mr M'Nab at Hudson's Bay, was effected by mixing snow with a vitriolic acid which had been previously congealed: and to this circumstance Mr Cavendish imputes the intensity of the cold, as the liquefaction both of the acid and the snow had concurred in producing the

same effect; while in mixing fluid acids with snow, the thawing of the snow is probably the only productive cause.

"To compare the times requisite for the liquefaction of ice and of congealed oil of vitriol, two equal and similar glasses were filled, one with the congealable vitriolic acid, the other with water; and after having immersed them in a freezing mixture, till both were congealed and reduced to the temperature of 28°, the glasses were withdrawn, wiped dry, and placed in a room where the thermometer stood at 62°. The ice thawed in 40 minutes, and the acid in 95; at the end of which time the thermometer, which stood near the glasses, had risen to 64°. Hence it appears that the congealed acid requires more than twice the time for its liquefaction than ice does, though it cannot thence be fairly inferred, that the cold generated by the liquefaction of the ice and of congealed acid are in the above proportions of the times, from the following considerations, viz. that as, during the liquefaction of the ice, its temperature remains stationary at 32°, and during the liquefaction of the acid, its temperature remains about 44 or 45°, it appears, that the ice being considerably colder than the acid, will take the heat from the contiguous air much faster. By this experiment, however, we know that a considerable quantity of cold is generated by the liquefaction of the acid; and hence it appears probable, that in producing cold artificially, by mixing snow with acids in very cold temperatures, it would probably be useful to employ a vitriolic acid of the proper density for congelation, and to freeze it previously to its mixture with snow. It must not, however, be imagined, that the cold generated by the mixture of these two frozen substances is nearly equal to the sums of the colds generated by the separate liquefactions of the congealed acid and ice, when singly exposed to a thawing temperature; for the mixture resulting from the liquefaction, consisting of the vitriolic acid and the water of the snow, appears from the generation of heat which occurs from the mixture of these ingredients in a fluid state, to be subject to different laws than those which rule either of the ingredients separately.

"The vitriolic acid, like water and other fluids, is capable of retaining its fluidity when cooled considerably below its freezing point. A phial containing some congealable vitriolic acid being placed in a mixture of salt, snow, and water, a thermometer was soon afterwards immersed in it while the acid was yet fluid, on which it quickly sunk from 50 to 29°. On moving the thermometer in the fluid, to make it acquire the exact temperature, the mercury was observed suddenly to rise; and on looking at the acid, numberless small crystals were observed floating in it, which had been suddenly formed. The degree to which the mercury then rose was 46½°; and at another time, while the acid was freezing, it stood at 45°."

From these experiments our author infers, "1. That the vitriolic acid has a point of easiest freezing, and that this is when its specific gravity is to that of water as 1780 to 1000. 2. That the greater or less disposition to congelation does not depend on any other circumstance than the strength of the acid. 3. That the freezing and thawing degree of the most congealable acid is about 45° of Fahrenheit's scale. It is, however,

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however, to be observed, that this degree is inferred from the temperature indicated by the thermometers immersed in the freezing and thawing acids; but the congelation of the fluid acid could never be accomplished without exposing it to a greater degree of cold, either by exposing it to the air in frosty weather or to the cold of melting snow. 4. Like water, this acid possesses the property of retaining its fluidity when cooled several degrees below the freezing point; and of rising suddenly to it when its congelation is promoted by agitation, or by contact even with a warmer thermometer. 5. That, like water and other congelable fluids, the vitriolic acid generates cold by its liquefaction, and heat during its congelation, though the quantity of this heat and cold remains to be determined by future experiments. 6. That the acid, by congelation, when the circumstances for distinct crystallization are favourable, assumes a regular crystalline form, a considerable solidity and hardness, and a density much greater than it possessed in its fluid state."

* Phil.
Trans.
vol. lxxvii.
p. 267.

Besides this species of congelation, the vitriolic acid is subject to another, probably the same described by Basil Valentine and some of the older chemists. This is effected in the ordinary temperature of the air, even in summer; and, according to Mr Keir*, is peculiar to that species of oil of vitriol which is distilled from green vitriol, and which is possessed of a smoking quality in a high degree; "for not only the authors (says Mr Keir) by whom this congelation has been observed, have given this description of the acid employed, but also the late experiments of Mr Dollfus, seem to show that this smoking quality is essential to the phenomenon: for neither the acid obtained from vitriol, when deprived by rectification of its smoking quality, nor the English oil of vitriol, which is known to be obtained by burning sulphur, and which does not smoke, were found by his trials to be susceptible of this species of congelation. It may, however, be worth the attention of those chemists who have an opportunity of seeing this *icy oil of vitriol*, as it is called, to observe more accurately than has yet been done, the freezing temperature and the density of the congelable acids; and to examine whether the density of this smoking acid also is connected with the glacial property. It seems also further deserving of investigation, whether there be not some analogy between the congelation of the smoking oil of vitriol and the very curious crystallization which Dr Priestley observed in a concentrated vitriolic acid saturated with nitrous acid vapours; and whether this smoking quality does not proceed from some marine or other volatile acid, which may be contained in the martial vitriol whence the vitriolic acid is obtained."

Mr Keir also observes, that M. Cornatter has effected the crystallization of vitriolic acid, by distilling it with nitrous acid and charcoal; and we can add from our own experience, that a crystallization instantly takes place on allowing the fumes of the nitrous and vitriolic acids to mix together; and this, whether the former be procured from martial vitriol or sulphur, and whether it be in a phlogisticated state or not, concentration in both acids is here the only requisite.

CONGER, in zoology. See MURÆNA.

CONGERIES, a Latin word, sometimes used in

our language for a collection or heap of several particles of bodies united into one mass or aggregate.

CONGESTION, in medicine, a mass or collection of humours, crowded together and hardened in any part of the body, and there forming a preternatural tumor.

Congestion is effected by little and little: in which it differs from *defluction*, which is more sudden.

CONGIARIUM, CONGIARY, among medalists, a gift or donative represented on a medal. The word comes from the Latin *congius*; because the first presents made to the people of Rome consisted in wine and oil, which were measured out to them in *congii*. The congiary was properly a present made by the emperors to the people of Rome. Those made to the soldiers were not called *congiaries* but *donatives*. The legend on medals representing *congiaries*, is, *Congiarium* or *Liberalitas*. Tiberius gave a congiary of three hundred pieces of money to each citizen: Caligula twice gave three hundred sesterces a head: Nero, whose congiaries are the first that we find represented on medals, gave four hundred.

CONGIUS, a liquid measure of the ancient Romans, containing the eighth part of the amphora, or the fourth of the urna, or six sextarii. The congius in English measure contains 2,070,676 solid inches; that is, seven pints, 4,942 solid inches.

CONGLOBATE GLAND. See ANATOMY.

CONGLOMERATE GLAND. *Ibid.*

CONGLOMERATE Flowers, are those growing on a branching foot-stalk, to which they are irregularly but closely connected. This mode of inflorescence, as Linnæus terms it, is opposed to that in which the flowers are irregularly and loosely supported on their foot-stalks, hence termed a *diffuse panicle*†. The term is exemplified in several of the grasses, particularly in some species of the *poa*, fescue grass, and agrostis.

CONGLUTINATION, the gluing or fastening any two bodies together by the intromission of a third, whose parts are unctuous and tenacious, in the nature of glue. See GLUE.

CONGO, a kingdom of Africa, bounded on the north by the river Zair, or Zarah, which divides it from Loanga; on the south by the river Danda, which separates it from Angola; on the east by the kingdoms of Fungono and Metamba, and the burnt mountains of the sun, those of crystal or salt-petre and silver, or (according to Anthony Cavazzi, a late traveller into those parts) by the mountains of Coanza, Berbela, and the great mountain of Chilandia or Aquilonda; and on the west by that part of the Atlantic ocean called the *Ethiopic sea*, or the *sea of Congo*. According to these limits, Congo Proper extends about three degrees from north to south; lying between 6° and 9° S. Lat.; but widens in its breadth inland, by the course of the river Zair, which runs winding above two degrees more to the north. Its length from east to west is very uncertain, as no observations have been taken of the exact situation of those mountains which bound it.

The history of this kingdom affords but few interesting particulars. Before its discovery by the Portuguese, the history is altogether uncertain and fabulous, as the inhabitants were totally unacquainted with letters

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† See P.
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Congo. letters and learning. So little were they acquainted with chronology, that it is said they did not even distinguish between day and night; much less could they compute their time by moons or years; and therefore could remember past transactions only by saying they happened in such a king's reign.

³ The country discovered by the Portuguese in 1484. The discoverer was named *Diego Cam*, an expert and bold sailor. He was very well received by the natives, and sent some of his men with presents to the king; but they being detained by unexpected accidents beyond the promised time of their return, Cam was obliged to sail away without them, and took with him four young Congoese, as hostages for the safety of his countrymen. These he taught the Portuguese language, in which they made such progress that King John was highly pleased, and sent them back next year to Congo with rich presents; charging them to exhort their monarch, in his name, to become a convert to the Christian religion, and to permit it to be propagated through his dominions. A firm alliance was concluded between the two monarchs, which continues to this day, though not without some interruptions, to which the Portuguese themselves have given occasion more than the natives.

⁴ Cavazzi's account of Congo. Any particular account we have of this kingdom, rests almost entirely on the credit of Anthony Cavazzi, the traveller above mentioned. He was a capuchin-friar, a native of the duchy of Modena, and was sent missionary into those parts *de propaganda fide*, in the year 1654, and arrived at Congo the same year. During his stay there, his zeal to make converts made him travel through all these different kingdoms; and the credit he gained, as well as the great employments he was intrusted with, gave him an opportunity of informing himself of every thing relating to them with great exactness. The extent and situation, however, he could not possibly ascertain, for want of instruments; nor hath this defect been since supplied. According to him the dominions of Congo extended a great deal further eastward and southward before the introduction of Christianity than afterwards; a great number of the states that were under the Congoese monarchs, either as subjects, or tributary, having withdrawn their allegiance out of dislike to them on that account. Not content with opposing the officers and troops that came annually to raise the tribute imposed by the king, they made such frequent and powerful incursions into his dominions, that they obliged him to draw his forces nearer the centre of Congo to prevent an invasion; by which means the kingdom, from an extent of 600 leagues, was reduced to less than one half.

⁵ Extent lessened since the introduction of Christianity. ⁶ Account of the climate and seasons. Congo Proper being situated within the torrid zone, is liable to excessive heats: as it lies on the southern side of the equinoctial, the seasons are of course opposite to ours. They reckon only two principal seasons, the summer and winter; the former begins in October, and continues till February or March; during which time the sun's rays dart with such force, that the atmosphere appears to an European to be in a flame. The excessive heat, however, is mitigated by the equal length of the days and nights, as well as by the winds, breezes, rains, and dews. The winter takes up the other part of the year; and is said by the natives to

be proportionally cold, though to an European it would appear hot. These two seasons they divide into six lesser ones, viz. Massanza, Neasu, Ecundi, Quitombo, Quibiso, and Quibangala.

Massanza begins with the month of October, which is the beginning of their spring. The rains begin to fall at that time, and continue during the next two, and sometimes three, months. When they do so, the low lands are commonly overflowed by the extraordinary floods, and all their corn carried off. A disaster of this kind is commonly followed by a famine; for the lazy inhabitants take no care to lay up any provisions, although such misfortunes happen very frequently. This first season they reckon commences at the time the plants begin to spring.

The second season, Neasu, begins about the end of January, when the produce of their lands has arrived at its full height, and wants but a few days of being ripened for harvest. This first crop is no sooner gathered in, than they sow their fields afresh, their land commonly yielding them two harvests.

The third and fourth seasons, called *Ecundi* and *Quitombo*, are frequently blended together towards the middle of March, when the more gentle rains begin to fall, and continue to do so till the month of May. These two seasons are distinguished by the greater or lesser quantity of rain that falls during that interval. During the rest of the time, the air is either very clear, hot, and dry; or the clouds being overcharged with electric matter, burst out into the most terrible thunders and lightnings, without yielding the least drop of rain, though they seem loaded with it.

The two last, viz. the Quibiso and Quibangala, make up their short winter, which consists not in frost or snow, but in dry, blasting winds, which strip the earth of all its verdure, till the next Massanza begins to restore them to their former bloom.

They now divide their year into twelve lunar months, and begin it in September. They have also weeks consisting of four days only, the last of which is their sabbath; and on it they religiously abstain from every kind of work. This practice, the compilers of the Universal History conjecture to have arisen from the extreme laziness for which this people, and indeed all the African nations, are so remarkable. To this shameful indolence also is to be ascribed the little produce they reap from their lands, while the Portuguese settled among them, who are at more pains in the cultivation of theirs, enjoy all manner of plenty. The natives, however, had rather run the risk of the most terrible famines, than be at the tenth part of the labour they see the Portuguese take. They seem to think it below them to use any other exercises than those of dancing, leaping, hunting, shooting, &c.; the rest of their time they spend in smoking, and downright idleness, committing the laborious part of their household affairs to their slaves, or, in want of them, to their wives. Nothing is more common than to see these poor creatures toiling in the fields and woods with a child tied to their backs, and fainting under their excessive labour and heavy burdens, or (which is still worse) hunger and thirst. What is yet more surprisingly shameful is, that though they have plenty of domestic animals which they might easily make use of for cultivating their grounds, and for other labori-

Congo.

⁷ Natives excessively indolent.

Congo. ous services, and though they see the Portuguese do it every day to great advantage; yet they will rather see their tender females sink under their toil and labour, than be at the trouble of breeding up any of these useful creatures to their assistance.

8
Vegetables
produced in
Congo. The ground produces variety of grain, but no corn or rice except what is cultivated by the Portuguese. Their maize, or Indian wheat, grows very strong, and is well laden. This, being well ground, they make into bread, or boil with water into a kind of pap. Of this they have four kinds; one of which resembling what we call French wheat, is produced in plenty, and makes some amends for the want of indutry in the people. They cultivate also a variety of the pease and bean kind: but what they chiefly live upon, as most suitable to their lazy disposition, is a kind of nut, like our filberds, which fall to the ground of themselves, and are to be found every where; every nut that falls to the ground producing a new shrub next year. They have scarcely any fruit-trees but what have been brought thither by the Portuguese. They have various sorts of palm-trees, useful both by their fruit, leaves, and their juice, which is easily converted into wine; also by affording a kind of oil with which they dress their victuals, though the Europeans use it only to burn in their lamps. They have also a vast number of plants and shrubs, which it would be impossible to describe or enumerate. Wheat is the only thing that the ground will not produce. It pushes forth, indeed, the straw and the ear; the former of which grows high enough, we are told, to hide a man on horseback, but the latter is empty, without one grain fit for use. Father Labat, however, who had lived a considerable time in some of the American islands, where he had observed the same thing, tells us, that he had the curiosity to examine those ears more carefully, and had found some few grains; and that, having sowed them afresh, they produced very long ears, full of large heavy grain. Whence he conjectures, that if the Portuguese had tried the same experiment in their African settlements, it might perhaps have been attended with the same success.

9
Hazardous
travelling. In the low lands the grass grows so high, rank, and thick, that it becomes one of the most dangerous receptacles for wild beasts, serpents, and other venomous insects: on this account travelling is exceedingly hazardous, as they have few beaten roads in the whole country, and travellers are obliged to march over it through vast plains, in continual danger of being devoured or stung to death; to say nothing of the manifold diseases produced by the unwholesome dews with which the grass is covered during some part of the day. The only method of guarding against all these evils effectually, is by setting fire to the grass in the hot weather, when it is quite parched by the heat of the sun: but even this cannot be done without the greatest danger; because both the wild beasts and venomous reptiles, being roused out of their places of retirement, will fly furiously at those who happen to be in the way. In this case there is no possibility of escaping, but by climbing up the highest trees, or defending one's self by fire-arms or other weapons. In such emergencies, the natives have a much better chance than the Europeans; the former being able to climb trees with surprising swiftness;

while the latter must be assisted with rope-ladders, which they commonly cause their blacks to carry about with them, and to go up and fasten to one of the branches.

10
Great va-
riety of
flowers. The flowers are here exceedingly beautiful and numerous. Almost every field and grove yields a much nobler prospect than the European gardens can boast of, notwithstanding the pains bestowed on their cultivation. The flowers are remarkable, not only for the prodigious variety of their colours, but the vast quantity of heads which grow upon one stalk. In the day-time, indeed, they seem to have lost their natural fragrancy; that being in some measure exhaled by the heat of the sun: but this is amply compensated after its setting, and more especially a little before its rising, when their sweetness is again condensed, and revived by the coldness and dews of the night, after which they exhale their various refreshing scents in a much higher degree than ours. The lilies, which there grow naturally in the fields, valleys, and woods, excel those of our gardens, not only in their extreme whiteness, but much more in a delightful fragrancy, without offending the head, as the European lilies do by their faintish sweetness. The tulips which there grow wild, though generally called *Perfic*, have something so surprisingly charming in the variety and combination of their colours, that they dazzle the eyes of an intense beholder: neither do their flowers grow singly as with us, but ten or twelve upon one stalk; and with this double advantage, that they diffuse a very reviving and agreeable sweetness, and continue much longer in their full bloom. Of the same nature are their tuberosus, hyacinths, and other native flowers; which spring up in vast groups of 100 and 200 from one root, though somewhat smaller than ours; some of them finely variegated, and all of them yielding an agreeable smell. The roses, jessamines, and other exotics brought thither from Europe or America, come up likewise in great perfection; but require a constant supply of water, and diligent attendance, to prevent them from degenerating. The American jessamine, in particular, instead of single flowers, will grow up by dozens in a bunch; some of them of an exquisite white, and others of the colour of the most vivid fire.

11
Animals of
different
kinds. A vast variety of animals of different kinds are found in the kingdom of Congo; the chief of which are the elephant. This creature is mostly found in the province of Bamba, which abounds with woods, pasture, and plenty of water; the elephants delighting much to bathe themselves during the heat of the day. They commonly go in troops of an hundred or more; and some of them are of such a monstrous size, that we are told the print of their hoof hath measured four, nay seven, spans in diameter. From the hair of their tails, and that of some other animals, the natives, especially the women, weave themselves collars, bracelets, girdles, &c. with variety of devices and figures, which denote their quality; and are in such esteem, that the hair of two elephants tails is sufficient to buy a slave. The reason of this is, that the natives have not the art of taming them, but are obliged to send some of their bravest and stoutest men to hunt them in the woods; which is not done without great labour and danger, they being here exceedingly fierce. The most common way of hunting them

Congo.

them is by digging deep holes in the ground, the top of which they cover with branches and leaves, as is practised in most parts of Asia.

Lions, leopards, tigers, wolves, and other beasts of prey, abound here in great plenty, and do much damage. Here are also a vast variety of monkeys of all sizes and shapes. The zebra, well known for its extreme beauty and swiftness, is also met with in this country. They have also a variety of buffaloes and wild asses; but the *dante* seems to be an animal peculiar to this kingdom. It is shaped and coloured much like an ox, though not so large. Its skin is commonly bought by the Portuguese, and sent into Germany to be tanned and made into targets, which are then called *dantes*. The natives make use of their raw hide dried to make their shields; which are so tough that no arrow or dart can pierce them; and they are also large enough to cover the whole body. The creature is vastly swift; and when wounded, will follow the scent or smoke of the gunpowder with such fury, that the hunter is obliged to climb up a tree with all possible speed; and this retreat he always takes care to secure before he ventures to fire. The wounded beast finding its enemy out of its reach, stays for him at the foot of the tree, and will not stir from it; of which the hunter taking the advantage, dispatches it with repeated shots. The forests of Congo also swarm with wild dogs, who, like the wolves, prey upon the tame cattle, and are so fierce that they will attack armed men. Their teeth are exceeding keen and sharp; they never bark, but make a dreadful howling when famished or in pursuit of their prey.

12
Birds.

This country also abounds with all the different kinds of birds that are to be found in other warm climates. One sort, which they call *birds of music*, is greatly esteemed, inasmuch that persons of the highest rank have from time immemorial taken the greatest delight in keeping them in cages and aviaries for the sake of their surprising melody. On the other hand, as the Congolese are superstitious to the last degree, there are several kinds of birds which they look upon as ominous, and are so terrified at the sight or hearing of them, that if they were going to enter upon ever so momentous an expedition, if they were met in council, or going to engage an enemy with ever so great an advantage, the flight or cry of such birds would throw them into a general panic, and disperse them in the utmost haste and confusion. The most dreadful of the ominous kind are the crows, ravens, bats, and owls. The great owl is the most terrible of all, and to him they give the name of *kariam pemba*, by which words they likewise denote the devil.

13
Ants very
dangerous.

Fish of different kinds abound on the coasts of Congo in great numbers; but the inland parts are infested with such numbers of serpents, scorpions, and other venomous insects, as are perhaps sufficient to overbalance every natural advantage we have yet mentioned. The most pernicious and dangerous kind are the ants; of which they reckon no less than six several species of different colours and sizes; all of them formidable on account of their prodigious numbers, and the mischief they do not only to the fruits of the earth, but to men and beasts; whom they will surround in the night-time, and devour even to the very bone. It is a common practice, we are told, to condemn persons guilty of

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some atrocious crimes to be stripped naked, tied hand and foot, and thrown into a hole where these insects swarm; where they are sure to be devoured by them in less than 24 hours to the very bones. But criminals are not the only persons who are in danger from the jaws of these little devouring insects. People may be attacked by them, as we have already hinted, in the night-time, and while they are sleeping in their beds. This obliges the natives to be careful where they lie down, and to kindle a small fire, or at least to have a circle of burning hot embers round their beds. This caution is still more necessary in the country villages and hamlets, where persons are otherwise in danger of being attacked by millions of them in the dead of the night. In such a case the only expedient to save one's self is to jump up as soon as one feels the bite, to brush them off with all possible speed, and then at once to set the house on fire. The danger is still greater in travelling through the country, where a person is often obliged to take up his lodging on the bare ground; and may be overtaken during the heat of the day with such profound sleep, as not to be awaked by these diminutive animals till they have made their way through the skin; and in such a case nothing will prevent their devouring a man alive, though there were ever so many hands to assist him: in such incredible quantities do these creatures abound, notwithstanding the great numbers of monkeys who are continually ferreting the ants out of their retreats, and feed upon them with the utmost avidity. This can only be ascribed to the natural laziness and indolence of the inhabitants; which is such, that they not only neglect to rid their lands of them by proper cultivation, but will suffer their houses, nay even their very churches, to be undermined by them. Another kind of these destructive vermin lie so thick upon the paths and highways, that a person cannot walk without treading upon, and having his legs and thighs almost devoured by them. A third sort of a white and red colour, but very small, will gnaw their way through the hardest wood, penetrate into a strong chest, and in a little while devour all the clothes, linen, and every thing that is in it. A fourth sort, small and black, leave a most intolerable stench upon every thing they touch or crawl over, whether clothes or household-stuff, which are not easily sweetened again; or if they pass over victuals, they are entirely spoiled. A fifth sort harbour chiefly on the leaves and branches of trees; and if a man chance to climb up thither to save himself from a wild beast, he is so tormented by them, that nothing but the fear of the jaws of the one could make him endure the stings of the other. A sixth sort is of the flying kind; and is probably one of the former kinds, that live wholly under ground, till nature furnishes them with wings. After this, they rise in such swarms as darken the air, and would make terrible havoc among all kinds of vegetables, did not the natives come out against them in whole companies, and by dint of flaps, and other flat weapons, knock them down by myriads, and then laying them in heaps, set fire to their wings, which half broils them for food. Amidst all this variety of pernicious insects, however, they have one species of a more friendly and profitable kind, viz. the industrious bee, which furnishes the inhabitants with honey and wax in such plenty, that there is

¹⁴ Congo. scarce a hollow tree, clift of a rock, or chop of the earth, in which their combs are not found in great quantities.

¹⁴ Congo very populous. With respect to the populousness of the kingdom of Congo, some authors, writing either from mere conjecture, or at best precarious inferences, have represented it as thinly peopled. The accounts of the missionaries and Portuguese, however, are directly opposite to these. They found the country for the most part covered with towns and villages, and these swarming with inhabitants; the cities well filled with people, particularly the metropolis, which is said to contain above 50,000 souls. The provinces, though not equally populous, yet in the whole make up such an amount, as plainly proves, that what is wanting in the one is amply made up by the other. We are told, that the duchy of Bamba is still able to raise 200,000 fighting men, and was formerly in a condition to raise double that number; and that the army of the king of Congo, in the year 1665, consisted of 900,000 fighting men, who were attended by an infinite number of women, children, and slaves. The numbers of the Congoese will appear the more credible, when we consider the extreme fecundity of their women, the hardiness with which they bring up their children, and the stoutness and healthiness of their men. In some villages, if the missionaries are to be credited, the number of children is so great, that a father will part with one or two, for any commodity he wants, or even for some trifling bawble he fancies; so that the number of slaves they sell abroad seldom amounts, *communibus annis*, to less than 15,000 or 16,000.

¹⁵ Congoese have a high opinion of themselves. There is scarce a nation on earth that have a higher opinion of themselves or their country, than the Congoese, or that is more hardened against all conviction to the contrary, from reason, experience, or the most impartial comparison with other countries in Europe or Asia. Indeed, it is impossible they should think otherwise, when it is one of the fundamentals of their belief, that the rest of the world was the work of angels, but that the kingdom of Congo, in its full and ancient extent, was the handywork of the Supreme Architect; and must of course have vast prerogatives and advantages over all others. When told of the magnificence of the European and Asiatic courts, their immense revenues, the grandeur of their palaces and edifices, the richness and happiness of their subjects, the great progress they have made in the arts and sciences to which their country is wholly a stranger, they coolly answer, that all this comes vastly short of the dignity and splendor of the kings and kingdom of Congo; and that there can be but one Congo in the world, to the happiness of whose monarch and people all the rest were created to contribute, and to whose treasury the sea and rivers pay their constant tribute of 'zim-bis (or shells, which are their current coin); whilst other princes must condescend to enrich themselves by digging through rocks and mountains, to come at the excrements of the earth, so they style gold and silver which are in such request among other nations. Accordingly, they imagine, that the nations which come to traffic with them, are forced to that servile employment by their poverty and the badness of their country, rather than induced to it by luxury or avarice; whilst they themselves can indulge their natural indo-

lence or sloth, though attended with the most pinching poverty, rather than disgrace the dignity of their blood by the least effort of industry, which, how laudable and beneficial soever, is looked upon by them as only a lesser degree of slavery. But though they generally esteem it so much below their dignity to apply to any useful work, they think it no disgrace to beg or steal. With respect to the first, they are said to be the most shameless and importunate beggars in the world. They will take no denial, spare no crouching, lying, prayers, to obtain what they want, nor curses and ill language when sent away without it. With regard to the last, they deem no theft unlawful or scandalous, except it be committed in a private manner, without the knowledge of the person wronged. It is esteemed a piece of bravery and gallantry to wrench any thing from another by violence; and this kind of theft is so common, not only among the vulgar, but also among the great ones, that they make no scruple, in their travels from place to place, to seize not only upon all the provisions they meet with in towns and villages, but upon every thing else that falls in their way. These violences oblige the poor people to conceal the few valuables they have, in some secret place out of the knowledge and reach of those harpies; and they think themselves well off if they can escape a severe bastonading, or other cruel usage frequently inflicted upon them, in order to make them discover the place of their concealment.

¹⁷ The complexion of the natives, both men and women, is black, though not in the same degree; some being of a much deeper black than others. Their hair is black and finely curled; some have it also of a dark sandy colour: their eyes are mostly of a fine lively black; but some are of a dark sea-colour. They have neither flat noses nor thick lips like the Nubians and other negroes. Their stature is mostly of the middle size; and, excepting their black complexion, they much resemble the Portuguese. In their temper they are mistrustful, envious, jealous, and treacherous; and where they once take a distaste or affront, will spare no pains, nor stick at any means, however base, to be avenged of, and crush their enemy under their feet. There is no such thing among them as natural affection. A husband, if an Heathen, may take as many wives as he pleases; and if a Christian, may have any number of concubines, whom he may divorce at pleasure, or even sell them though with child. So little regard have they for their children, that there is scarce one among them who will not sell a son or a daughter, or perhaps both, for a piece of cloth, a collar or girdle of coral or beads, and often for a bottle of wine or brandy.

¹⁸ The religion of the Congoese in many parts is downright idolatry, accompanied with the most ridiculous superstitions, and the most absurd and detestable rites invented by their gangas or priests; and even in those parts where Christianity is professed, it is so darkened by superstitions of one kind or other, that we may justly question whether the people are any gainers by the exchange.

¹⁹ The government of this kingdom is monarchical, and as despotic as any in Asia or Africa. The kings are the sole proprietors of all the lands within their dominions; and these they can dispose of to whom they

Congo.
16
Their sloth,
pride, &c.

17
Complexi-
on, charac-
ter, cu-
stoms, &c.

18
Religion-

19
Govern-
ment.

Congo, they please, upon condition they pay a certain tribute out of them: upon failure of the payment of which, or any other neglect, they turn them out. Even the princes of the blood are subjected to the same law; so that there is no person of any rank or quality whatever that can bequeath a foot of land to his heirs or successors; and when these owners under the crown die, the lands immediately return to it again, whether they were in their possession, or had been left to ever so many tenants under them; so that it entirely depends on the prince whether these lands shall be continued in the same, or be disposed into other hands. The Portuguese, however, since their settling in these parts, have prevailed upon the monarchs to permit the heirs and successors to continue in the quiet possession of such lands, in order to avoid the confusions, or even rebellions, which the alienation and deprival of them frequently occasioned, and to oblige the tenants of them to pay their tribute more exactly and readily than they did before.

20 Commerce St Salvador is the chief place of traffic the Portuguese and other Europeans have in this country. There are thought to be about 4000 of them settled here, who trade with most parts of the kingdom. The chief commodities they bring thither are either the product of Brazil or European manufactures. The former consist chiefly of grains, fruits, plants, &c.; the latter of Turkey carpets, English cloth, and other stuffs; copper, brass vessels, some kinds of blue earthen ware, rings, and ornaments of gold, silver, and other baser metals; coral, glass-beads, bugles, and other trinkets; light stuffs made of cotton, woollen, and linen, for cloathing; and a great variety of tools and other utensils. In return for these, they carry off a great number of slaves, amounting to 15,000 or 16,000 annually, as we have already observed. Formerly they used also to carry away elephants teeth, furs, and other commodities of the country; but these branches of commerce are now greatly decayed, and the slave-trade is what the Portuguese merchants principally depend on.

CONGO, a term applied to tea of the second quality.

CONGREGATION, an assembly of several ecclesiastics, united so as to constitute a body.

The term is principally used for assemblies of cardinals appointed by the pope, and distributed into several chambers, for the discharge of certain functions and jurisdictions, after the manner of our offices and courts. The first is the congregation of the holy office, or the inquisition: the second, that of jurisdiction over bishops and regulars: the third, that of councils; this has power to interpret the council of Trent: the fourth that of customs, ceremonies, precedences, canonizations, called *the congregation of rites*: the fifth, that of St Peter's fabric, which takes cognizance of all causes relating to piety and charity, part whereof is due to the church of St Peter: the sixth, that of waters, rivers, roads: the seventh, of fountains and streets: the eighth, that of the index, which examines the books to be printed or corrected: the ninth, that of the council of state, for the management of the territories belonging to the pope and church (see CAMERLINGO): the tenth, *de bono regimine*; of which two last the cardinal-nephew is chief: the eleventh,

that of money: the twelfth, that of bishops, wherein those who are to be promoted to bishoprics in Italy are examined; this is held before the pope: the thirteenth, that of consistorial matters; the chief whereof is the cardinal-dean: the fourteenth, a congregation for propagating the faith (see COLLEGE): and the fifteenth, that of ecclesiastical immunity, for settling suits against churchmen. There is also a congregation of alms, which takes care of every thing that relates to the subsistence of Rome and the state of the church.

CONGREGATION is also used for a company or society of religious cantoned out of this or that order; and making, as it were, an inferior order, or a subdivision of the order itself. Such are the congregations of the oratory, and those of Cluny, &c. among the Benedictines.

The word is also used for assemblies of pious persons in manner of fraternities, frequent among the Jesuits in honour of the Virgin, &c. It is likewise applied to the audience in a church, particularly as consisting of the inhabitants of the same parish.

CONGREGATIONALISTS, in church-history, a sect of Protestants who reject all church government, except that of a single congregation under the direction of one pastor.

CONGRESS, in political affairs, an assembly of commissioners, envoys, deputies, &c. from several courts meeting to concert matters for their common good.

CONGRESS, in America, is the assembly of delegates from the United States. See AMERICA.

CONGRESS, in a judicial sense, the trial made by appointment of a judge before surgeons and matrons, in order to prove whether or no a man be impotent, before sentence is passed for the dissolution of a marriage solicited upon such a complaint.

Neither the civil nor canon law makes any mention of the trial of virility by congress. It had its origin in France from the boldness of a young fellow, who, in open court, having been hard pressed by his wife, demanded the congress. The judge, surprised with the novelty of the demand, found it could not be denied, as being the surest evidence that the case could admit of. In time it became a branch in the French jurisprudence, and was authorised by decreets and arrets. It obtained for about 120 years; and was annulled by an arret of parliament in 1677, as being found precarious; some having failed under the experiment out of mere modesty and shame, which is found to have the same effect with actual impotency.

CONGREVE (William), a younger brother of an ancient family in Staffordshire. His father was employed in the stewardship of the great estate of the earl of Burlington in Ireland, where he resided many years; and our author was born there in 1672. Mr Congreve entered into the Middle-Temple when he came to England, and began to study the law; but his bias was toward polite literature and poetry. His first performance was a novel, intitled, *Incognita*, or *Love and Duty reconciled*. He soon after began his comedy of the *Old Bachelor*; which was the amusement of some leisure hours during a slow recovery from a fit of illness soon after his return to England; yet was in itself so perfect, that Mr Dryden, on its being shown to him, declared he had never in his life seen such a first play.

When

Congreve.

When brought on the stage in 1693, it met with such universal approbation, that Mr Congreve, though he was but 19 years old at the time of his writing it, became now considered as a prop to the declining stage, and a rising genius in dramatic poetry. The next year he produced the *Double Dealer*; which, for what reason is not obvious, did not meet with so much success as the former. The merit of his first play, however, had obtained him the favour and patronage of Lord Halifax, and some peculiar mark of distinction from Queen Mary; on whose death, which happened in the close of this year, he wrote a very elegant elegiac pastoral. In 1695, when Betterton opened the new house in Lincoln's-Inn fields, Mr Congreve joining with him, gave him his comedy of *Love for Love*, with which the company opened their campaign; and which met with such success, that they immediately offered the author a share in the management of the house, on condition of his furnishing them with one play yearly. This offer he accepted; but whether through indolence, or that correctness which he looked upon as necessary to his works, his *Mourning Bride* did not come out till 1697, nor his *Way of the World* till two years after that. The indifferent success this last mentioned play, though an exceeding good one, met with from the public, completed that disgust to the theatre, which a long contest with Jeremy Collier, who had attacked the immoralities of the English stage, and more especially some of his pieces, had begun, and he determined never more to write for the stage. However, though he quitted dramatic writing, he did not lay down the pen entirely; but occasionally wrote many little pieces both in prose and verse, all of which stand on the records of literary fame. It is very possible, however, that he might not so soon have given way to this disgust, had not the easiness of his circumstances rendered any subservience to the opinions and caprice of the town absolutely unnecessary to him. For his abilities having very early in life raised him to the acquaintance of the Earl of Halifax, who was then the Mæcenas of the age; that nobleman, desirous of raising so promising a genius above the necessity of too hasty productions, made him one of the commissioners for licensing hackney-coaches; or, according to Coxeter, a commissioner of the wine-licence. He soon after bestowed on him a place in the pipe-office; and not long after gave him a post in the customs worth 600*l.* *per annum*. In the year 1718, he was appointed secretary of Jamaica; so that, with all together, his income towards the latter part of his life was upwards of 1200*l.* a-year.

The greatest part of the last 20 years of his life was spent in ease and retirement; and he either did not, or affected not to give himself any trouble about reputation. Yet some part of that conduct might proceed from a degree of pride; to which purpose, T. Cibber, in his lives of the poets, Vol. IV. p. 93. relates the following anecdote of him: "When the celebrated Voltaire was in England, he waited upon Mr Congreve, and passed some compliments upon the merit and reputation of his works. Congreve thanked him; but at the same time told that ingenious foreigner, that he did not choose to be considered as an author, but only as a private gentleman, and in that light expected to be visited. Voltaire answered, that

if he had never been any thing but a private gentleman, in all probability he had never been troubled with that visit." He observes, in his own account of the transaction, that he was not a little disgusted with so unseasonable a piece of vanity.

Towards the close of his life he was much afflicted with the gout; and making a tour to Bath for the benefit of the waters, was unfortunately overturned in his chariot: by which, it is supposed, he got some inward bruise, as he ever after complained of a pain in his side; and, on his return to London, continued gradually declining in his health, till the 19th of January 1729, when he died, aged 57; and, on the 26th following, was buried in Westminster Abbey, the pall being supported by persons of the first distinction.

CONGRUITY, a suitableness or relation of agreement between things.

The terms *congruity* and *propriety* are not applicable to any single object: they imply a plurality, and obviously signify a particular relation between different objects. Thus we currently say, that a decent garb is suitable or proper for a judge; modest behaviour for a young woman; and a lofty style for an epic poem: and, on the other hand, that it is unsuitable or incongruous to see a little woman sunk in an overgrown farthingale, a coat richly embroidered covering coarse and dirty linen, a mean subject in an elevated style, an elevated subject in a mean style, a first minister darning his wife's stocking, or a reverend prelate in lawn sleeves dancing a hornpipe.

The perception we have of this relation, which seems peculiar to man, cannot proceed from any other cause, but from a *sense* of congruity or propriety; for, supposing us destitute of that sense, the terms would be to us unintelligible.

It is a matter of experience, that congruity or propriety, wherever perceived, is agreeable; and that incongruity or impropriety, wherever perceived, is disagreeable. The only difficulty is, to ascertain what are the particular objects that in conjunction suggest these relations; for there are many objects that do not: the sea, for example, viewed in conjunction with a picture, or a man viewed in conjunction with a mountain, suggest not either congruity or incongruity. It seems natural to infer, what will be found true by induction, that we never perceive congruity nor incongruity but among things that are connected together by some relation; such as a man and his actions, a principal and his accessories, a subject and its ornaments. We are indeed so framed by nature, as, among things so connected, to require a certain suitableness or correspondence, termed *congruity* or *propriety*; and to be displeased when we find the opposite relation of *incongruity* or *impropriety*.

If things connected be the subject of congruity, it is reasonable before-hand to expect, that a degree of congruity should be required proportioned to the degree of the connection. And upon examination we find this to hold in fact: where the relation is intimate, as between a cause and its effect, a whole and its parts, we require the strictest congruity; but where the relation is slight, or accidental, as among things jumbled together in the same place, we require little or no congruity: the strictest propriety is required

Congruity.

Congruity. quired in behaviour and manner of living; because a man is connected with these by the relation of cause and effect: the relation between an edifice and the ground it stands upon, is of the most intimate kind: and therefore the situation of a great house ought to be lofty; its relation to neighbouring hills, rivers, planes, being that of propinquity only, demands but a small share of congruity: among members of the same club, the congruity ought to be considerable, as well as among things placed for show in the same niche: among passengers in a stage coach, we require very little congruity; and less still at a public spectacle.

Congruity is so nearly allied to beauty, as commonly to be held a species of it; and yet they differ so essentially as never to coincide: beauty, like colour, is placed upon a single subject; congruity upon a plurality: further, a thing beautiful in itself, may, with relation to other things, produce the strongest sense of incongruity.

Congruity and propriety are commonly reckoned synonymous terms; but they are distinguishable; and the precise meaning of each must be ascertained. Congruity is the genus of which propriety is a species; for we call nothing *propriety*, but that congruity or suitability which ought to subsist between sensible beings and their thoughts, words, and actions.

In order to give a full view of these secondary relations, we shall trace them through some of the most considerable primary relations. The relation of a part to the whole, being extremely intimate, demands the utmost degree of congruity; even the slightest deviation is disgusting.

Examples of congruity and incongruity are furnished in plenty by the relation between a subject and its ornaments. A literary performance intended merely for amusement, is susceptible of much ornament, as well as a music-room or a play-house; for in gaiety, the mind hath a peculiar relish for show and decoration. The most gorgeous apparel, however improper in tragedy, is not unsuitable to opera-actors; the truth is, an opera, in its present form, is a mighty fine thing; but as it deviates from nature in its capital circumstances, we look not for nature nor propriety in those which are accessory. On the other hand, a serious and important subject admits not much ornament; nor a subject that of itself is extremely beautiful: and a subject that fills the mind with its loftiness and grandeur, appears best in a dress altogether plain.

To a person of a mean appearance, gorgeous apparel is unsuitable; which, besides the incongruity, has a bad effect; for by contrast it shows the meanness of appearance in the strongest light. Sweetness of look and manner, requires simplicity of dress, joined with the greatest elegance. A stately and majestic air requires sumptuous apparel, which ought not to be gaudy, nor crowded with little ornaments. A woman of consummate beauty can bear to be highly adorned, and yet shows best in a plain dress:

For loveliness
Needs not the foreign aid of ornament,
But is when unadorn'd, adorn'd the most.

Thomson's *Autumn*, 208.

Congruity regulates not only the quantity of ornament, but also the kind. The ornaments that em-

bellish a dancing room ought to be all of them gay. **Congruity.** No picture is proper for a church but what has religion for its subject. All the ornaments upon a shield ought to relate to war; and Virgil, with great judgment, confines the carvings upon the shield of Æneas to the military history of the Romans: but this beauty is overlooked by Homer; for the bulk of the sculpture upon the shield of Achilles, is of the arts of peace in general, and of joy and festivity in particular: the author of *Telemachus* betrays the same inattention, in describing that young hero.

In judging of propriety with regard to ornaments, we must attend, not only to the nature of the subject that is to be adorned, but also to the circumstances in which it is placed: the ornaments that are proper for a ball, will appear not altogether so decent at public worship; and the same person ought to dress differently for a marriage-feast and for a burial.

Nothing is more intimately related to a man, than his sentiments, words, and actions; and therefore we require here the strictest conformity. When we find what we thus require, we have a lively sense of propriety: when we find the contrary, our sense of impropriety is not less lively. Hence the universal distaste of affectation, which consists in making a show of greater delicacy and refinement than is suited either to the character or circumstance of the person.

Congruity and propriety, wherever perceived, appear agreeable; and every agreeable object produceth in the mind a pleasant emotion: incongruity and impropriety, on the other hand, are disagreeable; and of course produce painful emotions. These emotions, whether pleasant or painful, sometimes vanish without any consequence; but more frequently occasion other emotions, which we proceed to exemplify.

When any slight incongruity is perceived in an accidental combination of persons or things, as of passengers in a stage-coach, or of individuals dining at an ordinary; the painful emotion of incongruity, after a momentary existence, vanisheth without producing any effect. But this is not the case of propriety and impropriety: voluntary acts, whether words or deeds, are imputed to the author; when proper, we reward him with our esteem; when improper, we punish him with our contempt. Let us suppose, for example, a generous action suited to the character of the author, which raises in him and in every spectator the pleasant emotion of propriety: this emotion generates in the author both self esteem and joy; the former when he considers the relation to the action, and the latter when he considers the good opinion that others will entertain of him: the same emotion of propriety produceth in the spectators esteem for the author of the action: and when they think of themselves, it also produceth, by means of contrast, an emotion of humility. To discover the effects of an unsuitable action, we must invert each of these circumstances: the painful emotion of impropriety generates in the author of the action both humility and shame; the former when he considers his relation to the action, and the latter when he considers what others will think of him: the same emotion of impropriety produceth in the spectators contempt for the author of the action; and it also produceth, by means of contrast, when they think of them-

Congruity. themselves, an emotion of self-esteem. Here then are many different emotions, derived from the same action, considered in different views by different persons; a machine provided with many springs, and not a little complicated. Propriety of action, it would seem, is a chief favourite of nature, when such care and solicitude is bestowed upon it. It is not left to our own choice; but, like justice, is required at our hands; and, like justice, is enforced by natural rewards and punishments: a man cannot, with impunity, do any thing unbecoming or improper; he suffers the chastisement of contempt inflicted by others, and of shame inflicted by himself. An apparatus so complicated, and so singular, ought to rouse our attention: for nature doth nothing in vain; and we may conclude with great certainty, that this curious branch of the human constitution is intended for some valuable purpose.

A gross impropriety is punished with contempt and indignation, which are vented against the offender by corresponding external expressions: nor is even the slightest impropriety suffered to pass without some degree of contempt. But there are improprieties, of the slighter kind, that provoke laughter; of which we have examples without end, in the blunders and absurdities of our own species: such improprieties receive a different punishment, as will appear by what follows. The emotions of contempt and of laughter occasioned by an impropriety of this kind, uniting intimately in the mind of the spectator, are expressed externally by a peculiar sort of laugh, termed a *laugh of derision* or *scorn*. An impropriety that thus moves not only contempt, but laughter, is distinguished by the epithet of *ridiculous*; and a laugh of derision or scorn is the punishment provided for it by nature. Nor ought it to escape observation, that we are so fond of inflicting this punishment, as sometimes to exert it even against creatures of an inferior species; witness a turkeycock swelling with pride, and strutting with displayed feathers; a ridiculous object, which in a gay mood is apt to provoke a laugh of derision.

We must not expect, that these different improprieties are separated by distinct boundaries: for of improprieties, from the slightest to the most gross, from the most risible to the most serious, there are degrees without end. Hence it is, that in viewing some unbecoming actions, too risible for anger, and too serious for derision, the spectator feels a sort of mixt emotion, partaking both of derision and of anger; which accounts for an expression, common with respect to the impropriety of some actions, that we know not whether to laugh or be angry.

It cannot fail to be observed, that in the case of a risible impropriety, which is always slight, the contempt we have for the offender is extremely faint, tho' derision, its gratification, is extremely pleasant. This disproportion between a passion and its gratification, seems not conformable to the analogy of nature. In looking about for a solution, we must reflect upon what is laid down above, that an improper action not only moves our contempt for the author, but also, by means of contrast, swells the good opinion we have of ourselves. This contributes, more than any other article, to the pleasure we have in ridiculing follies and absurdities; and accordingly, it is well known, that they who put the greatest value upon themselves

are the most prone to laugh at others. Pride, which is Congruity, a vivid passion, pleasant in itself, and not less so in its gratification, would singly be sufficient to account for the pleasure of ridicule, without borrowing any aid from contempt. Hence appears the reason of a noted observation, That we are the most disposed to ridicule the blunders and absurdities of others, when we are in high spirits; for in high spirits, self-conceit displays itself with more than ordinary vigour.

With regard to the final causes of congruity and impropriety; one, regarding congruity, is pretty obvious, that the sense of congruity, as one principle of the fine arts, contributes in a remarkable degree to our entertainment. Congruity, indeed, with respect to quantity, coincides with proportion: when the parts of a building are nicely adjusted to each other, it may be said indifferently, that it is agreeable by the congruity of its parts, or by the proportion of its parts. But propriety, which regards voluntary agents only, can never be the same with proportion: a very long nose is disproportioned, but cannot be termed *improper*. In some instances, it is true, impropriety coincides with disproportion in the same subject, but never in the same respect; for example, a very little man buckled to a long toledo: considering the man and the sword with respect to size, we perceive a disproportion; considering the sword as the choice of the man, we perceive an impropriety.

The sense of impropriety with respect to mistakes, blunders, and absurdities, is happily contrived for the good of mankind. In the spectators, it is productive of mirth and laughter, excellent recreation in an interval from business. But this is a trifle in respect of what follows. It is painful to be the subject of ridicule; and to punish with ridicule the man who is guilty of an absurdity, tends to put him more upon his guard in time coming. Thus even the most innocent blunder is not committed with impunity; because, were errors licensed where they do no hurt, inattention would grow into a habit, and be the occasion of much hurt.

The final cause of propriety as to moral duties, is of all the most illustrious. To have a just notion of it, the moral duties that respect others must be distinguished from those that respect ourselves. Fidelity, gratitude, and the forbearing injury, are examples of the first sort; temperance, modesty, firmness of mind, are examples of the other: the former are made duties by the sense of justice; the latter by the sense of propriety. Here is a final cause of the sense of propriety, that must rouse our attention. It is undoubtedly the interest of every man, to suit his behaviour to the dignity of his nature, and to the station allotted him by Providence; for such rational conduct contributes in every respect to happiness, by preserving health, by procuring plenty, by gaining the esteem of others, and, which of all is the greatest blessing, by gaining a justly-founded self-esteem. But in a matter so essential to our well-being, even self-interest is not relied on: the powerful authority of duty is superadded to the motive of interest. The God of nature, in all things essential to our happiness, hath observed one uniform method: to keep us steady in our conduct, he hath fortified us with natural laws and principles, which prevent many aberrations, that would daily happen were we totally surrendered to so fallible a guide as human

Congruity. human reason. Propriety cannot rightly be considered in another light, than as the natural law that regulates our conduct with respect to ourselves; as justice is the natural law that regulates our conduct with respect to others. We call propriety a law, not less than justice; because both are equally rules of conduct that ought to be obeyed: propriety includes this obligation; for to say an action is proper, is, in other words, to say, that it *ought* to be performed; and to say it is improper, is, in other words, to say that it ought to be forborne. It is this very character of *ought* and *should* that makes justice a law to us; and the same character is applicable to propriety, though perhaps more faintly than to justice: but the difference is in degree only, not in kind; and we ought, without hesitation or reluctance, to submit equally to the government of both.

But it must, in the next place, be observed, that to the sense of propriety as well as of justice, are annexed the sanctions of rewards and punishments; which evidently prove the one to be a law as well as the other. The satisfaction a man hath in doing his duty, joined with the esteem and good will of others, is the reward that belongs to both equally. The punishments also, though not the same, are nearly allied; and differ in

degree more than in quality. Disobedience to the law of justice, is punished with remorse; disobedience to the law of propriety, with shame, which is remorse in a lower degree. Every transgression of the law of justice raises indignation in the beholder; and so doth every flagrant transgression of the law of propriety. Slighter improprieties receive a milder punishment: they are always rebuked with some degree of contempt, and frequently with derision. In general, it is true, that the rewards and punishments annexed to the sense of propriety, are slighter in degree than those annexed to the sense of justice: which is wisely ordered, because duty to others is still more essential to society than duty to ourselves: for society could not subsist a moment were individuals not protected from the headstrong and turbulent passion of their neighbours.

CONI, a strong town of Italy in Piedmont, and capital of a territory of that name, with a good citadel. The town being divided into two factions, it surrendered to the French in 1641; but was restored to the Duke of Savoy soon after. It is seated at the confluence of the rivers Gresse and Sture. E. Long. 7. 29. N. Lat. 44. 23.

Congruity.
Coni.

C O N I C S E C T I O N S

ARE curve lines formed by the intersections of a cone and plane.

If a cone be cut by a plane through the vertex, the section will be a triangle ABC, Plate CXLVI. fig. 1.

If a cone be cut by a plane parallel to its base, the section will be a circle. If it be cut by a plane DEF, fig. 1. in such a direction, that the side AC of a triangle passing through the vertex, and having its base BC perpendicular to EF, may be parallel to DP, the section is a parabola; if it be cut by a plane DR, fig. 2. meeting AC, the section is an ellipse; and if it be cut by a plane DMO, fig. 3. which would meet AC extended beyond A, it is an hyperbola.

If any line HG, fig. 1. be drawn in a parabola perpendicular to DP, the square of HG will be to the square of EP, as DG to DP; for let LHK be a section parallel to the base, and therefore a circle, the rectangle LGK will be equal to the square of HG, and the rectangle BPC equal to the square of EP; therefore these squares will be to each other as their rectangles; that is, as BP to LG, that is DP to DG.

SECT. I. Description of Conic Sections on a Plane.

1. PARABOLA.

“LET AB, fig. 4. be any right line, and C any point without it, and DKF a ruler, which let be placed in the same plane in which the right line and point are, in such a manner that one side of it, as DK, be applied to the right line AB, and the other side KF coincide with the point C; and at F, the extremity of the side KF, let be fixed one end of the thread FNC, whose length is equal to KF, and the other extremity of it at the point C, and let part of the thread, as FG, be brought close to the side KF by a small pin G; then let the square DKF be moved

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“from B towards A, so that all the while its side DK be applied close to the line BA, and in the meantime the thread being extended will always be applied to the side KF, being stopt from going from it by means of the small pin; and by the motion of the small pin N there will be described a certain curve, which is called a *semi-parabola*.

“And if the square be brought to its first given position, and in the same manner be moved along the line AB, from B towards H, the other semi-parabola will be described.”

The line AB is called the *directrix*; C, the focus; any line perpendicular to AB, a diameter; the point where it meets the curve, its vertex; and four times the distance of the vertex from the directrix, its latus rectum or parameter.

2. ELLIPSE.

“If any two points, as A and B, fig. 5. be taken in any plane, and in them are fixed the extremities of a thread, whose length is greater than the distance between the points, and the thread extended by means of a small pin C, and if the pin be moved round from any point until it return to the place from whence it began to move, the thread being extended during the whole time of the revolution, the figure which the small pin by this revolution describes is called an *ellipse*.

The points AB are called the *foci*; D, the *centre*; EF, the *transverse axis*; GH, the *lesser axis*; and any other line passing through D, a *diameter*.

3. HYPERBOLA.

“If to the point A, fig. 6. in any plane, one end of the rule AB be placed, in such a manner, that about that point, as a centre, it may freely move;

T t

“and

“ and if to the other end B, of the rule AB, be fixed
 “ the extremity of the thread BDC, whose length is
 “ smaller than the rule AB, and the other end of the
 “ thread, being fixed in the point C, coinciding with
 “ the side of the rule AB, which is in the same plane
 “ with the given point A; and let part of the thread,
 “ as BD, be brought close to the side of the rule AB,
 “ by means of a small pin D; then let the rule be
 “ moved about the point A, from C towards T, the
 “ thread all the while being extended, and the re-
 “ maining part coinciding with the side of the rule
 “ being stoppt from going from it by means of the
 “ small pin, and by the motion of the small pin D, a
 “ certain figure is described which is called the *semi-*
 “ *hyperbola*.”

The other semi-hyperbola is described in the same way, and the opposite HKF, by fixing the ruler to C, and the thread to A, and describing it in the same manner. A and C are called *foci*; the point G, which bisects AC, the centre; KE, the transverse axis; a line drawn through the centre meeting the hyperbolas, a transverse diameter; a line drawn through the centre, perpendicular to the transverse axis, and cut off by the circle MN, whose centre is E, and radius equal to CG, is called the *second axis*.

If a line be drawn through the vertex E, equal and parallel to the second axis GP and GO, be joined, they are called *asymptotes*. Any line drawn through the centre, not meeting the hyperbolas, and equal in length to the part of a tangent parallel to it, and intercepted betwixt the asymptotes, is called a *second diameter*.

An ordinate to any section is a line bisected by a diameter and the abscissa, the part of the diameter cut off by the ordinate.

Conjugate diameters in the ellipse and hyperbola are such as mutually bisect lines parallel to the other; and a third proportional to two conjugate diameters is called the *latus rectum* of that diameter, which is the first in the proportion.

In the parabola, the lines drawn from any point to the focus are equal to perpendiculars to the directrix; being both equal to the part of the thread separated from the ruler.

In the ellipse, the two lines drawn from any point in the curve to the foci are equal to each other, being equal to the length of the thread; they are also equal to the transverse axis. In the hyperbola the difference of the lines drawn from any point to the foci is equal, being equal to the difference of the lengths of the ruler and thread, and is equal to the transverse axis.

From these fundamental properties all the others are derived.

The ellipse returns into itself. The parabola and hyperbola may be extended without limit.

Every line perpendicular to the directrix of a parabola meets it in one point, and falls afterwards within it; and every line drawn from the focus meets it in one point, and falls afterwards without it. And every line that passes through a parabola, not perpendicular to the directrix, will meet it again, but only once.

Every line passing through the centre of an ellipse is bisected by it; the transverse axis is the greatest of

all these lines; the lesser axis the least; and these nearer the transverse axis greater than those more remote.

In the hyperbola, every line passing through the centre is bisected by the opposite hyperbola, and the transverse axis is the least of all these lines; also the second axis is the least of all the second diameters. Every line drawn from the centre within the angle contained by the asymptotes, meets at once, and falls afterwards within it; and every line drawn through the centre without that angle, never meets it; and a line which cuts one of the asymptotes, and cuts the other extended beyond the centre, will meet both the opposite hyperbolas in one point.

If a line GM, fig. 4. be drawn from a point in a parabola perpendicular to the axis, it will be an ordinate to the axis, and its square will be equal to the rectangle under the abscissa MI and latus rectum; for, because GMC is a right angle, GM^2 is equal to the difference of GC^2 and CM^2 ; but GC is equal to GE, which is equal to MB; therefore GM^2 is equal to $BM^2 - CM^2$; which, because CI and IB are equal, is (8 *Euc* 2.) equal to four times the rectangle under MI and IB, or equal to the rectangle under MI and the latus rectum.

Hence it follows, that if different ordinates be drawn to the axis, their squares being each equal to the rectangle under the abscissa and latus rectum, will be to each other in the proportion of the abscissas, which is the same property as was shown before to take place in the parabola cut from the cone, and proves those curves to be the same.

This property is extended also to the ordinates of other diameters, whose squares are equal to the rectangle under the abscissas and parameters of their respective diameters.

In the ellipse, the square of the ordinate is to the rectangle under the segments of the diameter, as the square of the diameter parallel to the ordinate to the square of the diameter to which it is drawn, or as the first diameter to its latus rectum; that is, LK^2 fig. 5. is to EKF as EF^2 to GH^2 .

In the hyperbola, the square of the ordinate is to the rectangle contained under the segments of the diameters betwixt its vertices, as the square of the diameter parallel to the ordinate to the square of the diameter to which it is drawn, or as the first diameter to its latus rectum; that is, SX^2 is to EXK as MN^2 to KE^2 .

Or if an ordinate be drawn to a second diameter, its square will be to the sum of the squares of the second diameter, and of the line intercepted betwixt the ordinate and centre, in the same proportion: that is, RZ^2 fig. 6. is to ZG^2 added to GM^2 , as KE^2 to MN^2 . These are the most important properties of the conic sections; and, by means of these, it is demonstrated, that the figures are the same described on a plane as cut from the cone; which we have demonstrated in the case of the parabola.

SECT. II. Equations of the Conic Sections

ARE derived from the above properties. The equation of any curve, is an algebraic expression, which denotes the relation betwixt the ordinate and abscissa; the abscissa being equal to x , and the ordinate equal to y .

If p be the parameter of a parabola, then $y^2 = px$; which is an equation for all parabolas.

If a be the diameter of an ellipse, p its parameter; then $y^2 : ax - xx : : p : a$; and $y^2 = \frac{p}{a} \times ax - xx$; an equation for all ellipses.

If a be a transverse diameter of a hyperbola, p its parameter; then $y^2 : ax + xx : : p : a$, and $y^2 = \frac{p}{a} \times ax + xx$.

If a be a second diameter of an hyperbola, then $y^2 = aa + xx : : p : a$; and $y^2 = \frac{p}{a} \times aa + xx$; which are equations for all hyperbolas.

As all these equations are expressed by the second powers of x and y , all conic sections are curves of the second order; and conversely, the locus of every quadratic equation is a conic section, and is a parabola, ellipse, or hyperbola, according as the form of the equation corresponds with the above ones, or with some other deduced from lines drawn in a different manner with respect to the section.

SECT. III. General Properties of Conic Sections.

A tangent to a parabola bisects the angle contained by the lines drawn to the focus and directrix; in an ellipse and hyperbola, it bisects the angle contained by the lines drawn to the foci.

In all the sections, lines parallel to the tangent are ordinates to the diameter passing through the point of contact; and in the ellipse and hyperbola, the diameters parallel to the tangent, and those passing through the points of contact, are mutually conjugate to each other. If an ordinate be drawn from a point to a diameter, and a tangent from the same point which meets the diameter produced; in the parabola, the part of the diameter betwixt the ordinate and tangent will be bisected in the vertex; and in the ellipse and hyperbola, the semi-diameter will be a mean proportion betwixt the segments of the diameter betwixt the centre and ordinate, and betwixt the centre and tangent.

The parallelogram formed by tangents drawn thro' the vertices of any conjugate diameters, in the same ellipse or hyperbola, will be equal to each other.

SECT. IV. Properties peculiar to the Hyperbola.

As the hyperbola has some curious properties arising from its asymptotes, which appear at first view almost incredible, we shall briefly demonstrate them.

1. The hyperbola and its asymptotes never meet: if not, let them meet in S , fig. 6.; then by the property of the curve the rectangle KXE is to SX^2 as GE^2 to GM^2 or EP^2 ; that is, as GX^2 to SX^2 ; wherefore, KXE will be equal to the square of GX ; but the rectangle KXE , together with the square of GE , is also equal to the square of GX ; which is absurd.

2. If a line be drawn through a hyperbola parallel to its second axis, the rectangle, by the segments of that line, betwixt the point in the hyperbola and the asymptotes, will be equal to the square of the second axis.

For if SZ , fig. 6. be drawn perpendicular to the second axis, by the property of the curve, the square of

MG , that is, the square of PE is to the square of GE , as the squares ZG and the square of MG together, to the square of SZ or GX : and the squares of RX and GX are in the same proportion, because the triangles RXG , PEG are equiangular; therefore the squares ZG and MG are equal to the square of RX ; from which, taking the equal squares of SX and ZG , there remains the rectangle RSV , equal to the square of MG .

3. Hence, if right lines be drawn parallel to the second axis, cutting an hyperbola and its asymptotes, the rectangles contained betwixt the hyperbola and points where the lines cut the asymptotes will be equal to each other; for they are severally equal to the square of the second axis.

4. If from any points, d and S , in a hyperbola, there be drawn lines parallel to the asymptotes da SQ and Sb dc , the rectangle under da and dc will be equal to the rectangle under QS and Sb ; also the parallelograms da , Gc , and SQG b , which are equiangular, and consequently proportional to the rectangles, are equal.

For draw YW RV parallel to the second axis, the rectangle Yd W is equal to the rectangle RSV ; wherefore, WD is to SV as RS is to dY . But because the triangles RQS , AYD , and GSV c d W , are equiangular, Wd is to SV as cd to Sb , and RS is to DY as SQ to da ; wherefore, dc is to Sb as SQ to da : and the rectangle dc , da , is equal to the rectangle QS , Sb .

5. The asymptotes always approach nearer the hyperbola.

For, because the rectangle under SQ and Sb or QG , is equal to the rectangle under da and dc , or AG , and QG is greater than aG ; therefore ad is greater than QS .

6. The asymptotes come nearer the hyperbola than any assignable distance.

Let X be any small line. Take any point, as d , in the hyperbola, and draw da , dc , parallel to the asymptotes; and as X is to da , so let aG be to GQ . Draw QS parallel to ad , meeting the hyperbola in S , then QS will be equal to X . For the rectangle SQG will be equal to the rectangle da G ; and consequently SQ is to da as AG to GQ .

If any point be taken in the asymptote below Q , it can easily be shown that its distance is less than the line X .

SECT. V. Areas contained by Conic Sections.

THE area of a parabola is equal to $\frac{2}{3}$ the area of a circumscribed parallelogram.

The area of an ellipse is equal to the area of a circle whose diameter is a mean proportional betwixt its greater and lesser axes.

If two lines, ad and QS , be drawn parallel to one of the asymptotes of an hyperbola, the space $aQSd$, bounded by these parallel lines, the asymptotes and the hyperbola will be equal to the logarithm of aQ , whose module is ad , supposing aG equal to unity.

SECT. VI. Curvature of Conic Sections.

THE curvature of any conic section, at the vertices of its axis, is equal to the curvature of a circle whose diameter is equal to the parameter of its axis.

If a tangent be drawn from any other point of a conic section, the curvature of the section in that point will be equal to the curvature of a circle to which the same line is a tangent, and which cuts off from the diameter of the section, drawn through the point, a part equal to its parameter.

SECT. VII. *Uses of Conic Sections.*

ANY body, projected from the surface of the earth, describes a parabola, to which the direction wherein it is projected is a tangent: and the distance of the directrix is equal to the height from which a body must fall to acquire the velocity wherewith it is projected: hence the properties of the parabola are the foundation of gunnery.

All bodies acted on by a central force, which decreases as the square of the distances increases, and impressed with any projectile motion, making any angle with the direction of the central force, must describe conic sections, having the central force in one of the foci, and will describe parabolas, ellipses, and hyperbolas, according to the proportion betwixt the central and projectile force. This is proved by direct demonstration.

The great principle of gravitation acts in this manner; and all the heavenly bodies describe conic sections having the sun in one of the foci; the orbits of the planets are ellipses, whose transverse and lesser diameters are nearly equal: it is uncertain whether the comets describe ellipses with very unequal axes, and so return after a great number of years; or whether they describe parabolas and hyperbolas, in which case they will never return.

SECT. VIII. *Uses of Conic Sections in the Solution of Geometrical Problems.*

MANY problems can be solved by conic sections that cannot be solved by right lines and circles. The following theorems, which follow from the simpler properties of the sections, will give a specimen of this.

A point equally distant from a given point and a given line, is situated in a given parabola.

A point, the sum of whose distances from two given points is given, is situated in a given ellipse.

A point, the difference of whose distances from two given points is given, is situated in a given hyperbola.

C O N

Conichthy-
odontes

Conissalæ.

CONICHTHYODONTES, or PLECTRONITÆ, in natural history, one of the three names the fossile teeth of fishes are known by.

CONIFERÆ, in botany, an order of plants in the *Fragmenta methodi naturalis* of Linnæus, containing the following genera, viz. cupressus, ephedra, equisetum, juniperus, pinus, taxus, thuja.

CONIFEROUS TREES, such as bear hard dry seed-vessels of a conical figure; consisting of several woody parts, being mostly scaly, adhering closely together, and separating when ripe.

CONIMBRICA (anc. geog.), a town of Lusitania, on the south side of the river Monda; from the ruins of which arose Coimbra, in its neighbourhood, a city of Portugal. W. Long. 9. 5. Lat. 40. 16.

CONINGSECK, a town of Suabia in Germany, and capital of a county of the same name. E. Long. 9. 23. N. Lat. 47. 50.

CONJOINT, in a general sense, signifies united or connected.

CONJOINT Degrees, in music, two notes which follow each other immediately in the order of the scale, as *ut* and *re*.

CONJOINT Tetrachords, two tetrachords, or fourths, where the same chord is the highest of one and the lowest of the other.

CONISSALÆ, in natural history, a class of fossils naturally and essentially compounded, not inflammable, nor soluble in water, found in detached masses, and formed of crystalline matter debased by earth.

Of this class there are two orders, and of each of these only one genus. Conissalæ of the first order are found in form of a naturally regular and uniform powder; all the genuine particles of which are nearly of one determinate shape, appearing regularly concreted, and not fragments of others once larger. Conissalæ of

C O N

the second order are found in form of a rude, irregular, and shapeless powder, the particles of which are never of any determinate figure, but seem broken fragments of once larger masses.

To the former genus belong the different kinds of sand; and to the latter the saburæ, or grits.

CONJUGATE DIAMETER, or *Axis*, of an Ellipsis, the shortest of the two diameters, or that bisecting the axis.

CONJUGATION, in grammar, a regular distribution of the several inflexions of verbs in their different voices, moods, tenses, numbers, and persons, so as to distinguish them from one another. See GRAMMAR and LANGUAGE.

CONIUM, HEMLOCK: A genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The partial involucre are halved, and mostly triphyllous; the fruit subglobose and quinque-striated, the striæ crenated on each side. The species are three; 1. The *maculatum*, or greater hemlock, grows naturally on the sides of banks and roads in many parts of Britain. It is a biennial plant which perishes after it has ripened its seeds. It hath a long taper root like a parsnip, but smaller. The stalk is smooth, spotted with purple, and rises from four to upwards of six feet high; branching out toward the top into several smaller stalks, garnished with decomposed leaves, whose lobes are cut at the top into three parts; these are of a lucid green, and have a disagreeable smell. The stalks are terminated by umbels of white flowers, each being composed of about ten rays or small umbels, and have a great number of flowers, which spread open, each sitting upon a distinct footstalk; the seeds are small and channelled, and like those of aniseed. It flowers in June, and the seeds ripen in autumn.

2. The

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Conium
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2. The *tenuifolium*, with striated seeds, differs from the first in having taller stalks, which are not so much spotted. The leaves are much narrower, and of a paler green; and this difference is constant. It is a biennial plant, and grows naturally in Germany. 3. The *africanum*, with prickly seeds, is a native of the Cape of Good Hope. The plant rarely grows above nine inches high; the lower leaves are divided like those of the small wild rue, and are of a greyish colour; those upon the stalk are narrower, but of the same colour; these are terminated by umbels of white flowers, each of the larger umbels being composed of three small ones; the involucre hath three narrow leaves situated under the umbel. This flowers in July and ripens seed in autumn, soon after which the plants decay.

Medicinal uses. The first species is sometimes applied externally, in the form of decoction, infusion, or poultice, as a discutient. These are apt to excoriate, and their vapour is to some particularly disagreeable and hurtful. The stalks are insignificant, and the roots very virulent. With regard to its virtue when taken internally, it has been generally accounted poisonous; which it doubtless is, in a high degree, when used in any considerable quantity. But Dr Stoerk has lately found, that in certain small doses it may be taken with great safety; and that, without at all disordering the constitution, or even producing any sensible operation, it sometimes proves a powerful resolvent in many obstinate disorders. In scirrhus, the internal and external use of hemlock has been found useful, but then mercury has been generally used at the same time. In open cancer, it often abates the pains, and is free from the constipating effects of opium. It is likewise used in scrophulous tumours and ulcers, and in other ulcers that are only defined by the term ill-conditioned. It is also recommended by some in chincough, and various other diseases. Its common, and perhaps best form, is that of the powdered leaves, in the dose at first of two or three grains a-day, which in some cases has been gradually increased to upwards of two ounces a-day, without producing giddiness. An extract from the seeds is said to produce giddiness sooner than that from the leaves. Hence, while both the London and Edinburgh colleges have given a place to the succus spissatus cicutæ, into the pharmacopœia of the latter an extractum seminum cicutæ is also introduced.

CONJUNCT, in a general sense, signifies conjoined, concurrent, or united.

CONJUNCT Rights, in Scots law. See Law, Part III. n° clxxx. 15, &c.

CONJUNCT, or *Confident Persons*, in Scots law. Ibid. n° clxxxiii. 8.

CONJUNCTION, in astronomy, the meeting of two or more stars or planets in the same degree of the zodiac.

CONJUNCTION, in grammar, an indeclinable word or particle, which serves to join words and sentences together, and thereby shows their relation or dependence upon one another. See GRAMMAR.

CONJURATION, magic words, characters, or ceremonies, whereby evil spirits, tempests, &c. are supposed to be raised, or driven away. The Romish priests pretend to expel devils, by preparing holy wa-

ter in a particular manner, and sprinkling it over the possessed, with a number of conjurations and exorcisms.

Some authors make the difference between conjuration and witchcraft to consist in this; that the former effects its end by prayers and invocation of God's name, &c. to compel the devil to do what is desired; so that the conjuror is supposed to be at war with the devil, and that evil spirit to act merely out of constraint: whereas the latter attains its end by an immediate application to the devil himself: and the devil's complaisance is supposed to be the consequence of some compact between them, so that the devil and the witch have a good understanding together. Both these, again, differ from enchantment and sorcery; in that these latter operate secretly and slowly by spells, charms, &c. without ever calling on the devil, or having any conference with him.

CONN. See COND.

CONNAUGHT, one of the four provinces of Ireland, bounded on the east by that of Leinster, on the west by the ocean, on the north and north-west by part of the ocean and province of Ulster, and on the south and east by Munster. It is about 130 miles in length, and 84 in breadth. It has no rivers of any great note besides the Shannon. It has several convenient bays and creeks, and is fertile in many places. It had several dangerous bogs, over-run with woods, which are now in some measure cleared away. This province produces abundance of cattle, sheep, deer, hawks, and honey; but the inhabitants being lazy, it is the least cultivated of all the four provinces. It contains 1 archbishopric, 5 bishoprics, 6 counties, 7 market-towns, 8 places of trade, 10 boroughs that send members to parliament, 47,256 houses, 24 old castles, besides fortresses that have been erected of late, and 330 parishes. The principal town is Galway.

CONNARUS, CEYLON SUMACH: A genus of the decandria order, belonging to the monodelphia class of plants; and in the natural method ranking with those of which the order is doubtful. The stigma is simple, the capsule bivalved, unilocular, and monospermous. There is but one species, viz. the monocarpus. This is a native of India, and rises with a ligneous stalk eight or ten feet high, which is hard, rigid, and covered with a black bark, and divides upward into two or three branches garnished with trifoliate leaves, having long footstalks placed alternate. It is propagated by cuttings, and is to be treated in the same manner with other tender exotics.

CONNECTICUT, a large river in New England, which gives name to one of the five colonies of that province (see the next article). It rises in a swamp on the height of land, in Lat. 45. 10. W. Long. 71. 30. After a sleepy course of eight or ten miles, it tumbles over four separate falls, and turning west keeps close under the hills which form the northern boundary of the vale through which it runs. The Amonoosuck and Israel rivers, two principal branches of Connecticut river, fall into it from the east, between the latitudes 44° and 45°. Between the towns of Walpole on the east, and Westminster on the west, side of the river, are the great Falls. The whole river, compressed between two rocks scarcely 30 feet asunder, shoots with amazing rapidity into a broad basin below. Over these

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Connecticut.

these falls, a bridge 160 feet in length, was built in 1784, under which the highest floods may pass without detriment. This is the first bridge that was ever erected over this noble river. Above Deerfield in Massachusetts it receives Deerfield river from the west, and Miller's river from the east, after which it turns westerly in a sinuous course to Fighting falls, and a little after tumbles over Deerfield falls, which are impassable by boats. At Windsor in Connecticut it receives Farmington river from the west; and at Hartford meets the tide. From Hartford it passes on in a crooked course, until it falls into Long Island sound, between Saybrook and Lyme.

The length of this river, in a straight line, is nearly 300 miles. Its general course is several degrees west of south. It is from 80 to 100 rods wide, 130 miles from its mouth. At its mouth is a bar of sand which considerably obstructs the navigation. Ten feet water at full tides is found on this bar, and the same depth to Middleton. The distance of the bar from this place, as the river runs, is 36 miles. Above Middleton are several shoals which stretch quite across the river. Only six feet water is found on the shoal at high tide, and here the tide ebbs and flows but about eight inches. About three miles below Middleton the river is contracted to about 40 rods in breadth by two high mountains. Almost every where else the banks are low, and spread into fine extensive meadows. In the spring floods, which generally happen in May, these meadows are covered with water. At Hartford the water sometimes rises 20 feet above the common surface of the river, and having all to pass through the above-mentioned strait, it is sometimes two or three weeks before it returns to its usual bed. These floods add nothing to the depth of water on the bar at the mouth of the river: this bar lying too far off in the sound to be affected by them.

On this beautiful river, whose banks are settled almost to its source, are many pleasant, neat, well-built towns. On its western bank, from its mouth northward, are the towns of Saybrook, Haddam, Middletown, Weathersfield, Hartford, Windsor, and Suffield, in Connecticut; West Springfield, Northampton, Hatfield, and Deerfield, in Massachusetts; Guilford, Brattleborough, in which is Fort Dummer, Westminster, Windsor, Hartford, Fairlee, Newbury, Brunswick, and many others in Vermont. Crossing the river into New Hampshire, and travelling on the eastern bank, you pass through Woodbury nearly opposite to Brunswick, Northumberland, the Coos country, Lyman, Orford, Lyme, Hanover, in which is Dartmouth College, Lebanon, Cornish, Clermont, Charleston, or N^o 4, Chesterfield, and many others in New Hampshire, Sunderland, Hadley, Springfield, Long Meadow, in Massachusetts; and in Connecticut, Enfield, East Windsor, East Hartford, Glastenbury, East Haddam, and Lyme.

This river is navigable to Hartford, upwards of 50 miles from its mouth, and the produce of the country for 200 miles above is brought thither in boats. The boats which are used in this business are flat-bottomed, long, and narrow, for the convenience of going up stream, and of so light a make as to be portable in carts. They are taken out of the river at three different carrying places, all of which make 15 miles.

Sturgeon, salmon, and shad, are caught in plenty in their season, from the mouth of the river upwards, excepting sturgeon, which do not ascend the upper falls; besides a variety of small fish, such as pike, carp, perch, &c.

From this river are employed three brigs of 180 tons each, in the European trade; and about 60 sail from 60 to 150 tons, in the West India trade; besides a few fishermen, and 40 or 50 coasting vessels.

CONNECTICUT, one of the five states of New England in America; bounded on the north by Massachusetts, on the east by Rhode Island; on the south, by the sound, which divides it from Long Island; and on the west, by the province of New York.

The divisional line between Connecticut and Massachusetts, as settled in 1713, was found to be about 72 miles in length. The line dividing Connecticut from Rhode Island was settled in 1728, and found to be about 45 miles. The sea coast, from the mouth of Paukatuk river, which forms a part of the eastern boundary of Connecticut, in a direct southwestwardly line to the mouth of Byram river, is reckoned at about 90 miles. The line between Connecticut and New York runs from latitude 41. 0. to latitude 42. 2.; 72 miles. Connecticut contains about 4674 square miles; equal to about 2,960,000 acres.

This state is watered by several fine rivers, the principal of which are, *Connecticut* described in the preceding article, Housatonic, and the Thames. One branch of the Housatonic rises in Lanesborough, the other in Windsor, both in Berkshire county in Massachusetts. It passes through a number of pleasant towns, and empties into the sound between Stratford and Milford. It is navigable 12 miles, to Derby. A bar of shells, at its mouth, obstructs its navigation for large vessels. In this river, between Salisbury and Canaan, is a cataract, where the water of the whole river, which is 150 yards wide, falls about sixty feet perpendicularly, in a perfectly white sheet. A copious mist arises, in which floating rainbows are seen in various places at the same time, exhibiting a scene exceedingly grand and beautiful.

The Thames empties into Long Island sound at New London. It is navigable 14 miles, to Norwich Landing. Here it loses its name, and branches into Shetucket on the east, and Norwich or Little river on the west. The city of Norwich stands on the tongue of land between these rivers. Little river, about a mile from its mouth, has a remarkable and very romantic cataract. A rock 10 or 12 feet in perpendicular height, extends quite across the channel of the river. Over this the whole river pitches, in one entire sheet, upon a bed of rocks below. Here the river is compressed into a very narrow channel between two craggy cliffs, one of which towers to a considerable height. The channel descends gradually, is very crooked, and covered with pointed rocks. Upon these the water swiftly tumbles, foaming with the most violent agitation, 15 or 20 rods, into a broad basin which spreads before it. At the bottom of the perpendicular falls, the rocks are curiously excavated by the constant pouring of the water. Some of the cavities, which are all of a circular form, are five or six feet deep. The smoothness of the water above its descent—the regularity and beauty of the perpendicular fall—the tremendous roughness

Connecticut.

Rivers

Connecticut.

roughness of the other, and the craggy, towering cliff which impends the whole, present to the view of the spectator a scene indescribably delightful and majestic. On this river are some of the finest mill seats in New England, and those immediately below the falls, occupied by Lathrop's mills, are perhaps not exceeded by any in the world. Across the mouth of this river is a broad, commodious bridge in the form of a wharf, built at a great expence.

Shetucket river, the other branch of the Thames, four miles from its mouth, receives Quinnabog, which has its source in Brimfield in Massachusetts: thence passing through Sturbridge and Dudley in Massachusetts, it crosses into Connecticut, and divides Pomfret from Killingly, Canterbury from Plainfield, and Lisbon from Preston, and then mingles with Shetucket. In passing through this hilly country, it tumbles over many falls, and affords a vast number of mill seats. The source of the Shetucket is not far from that of Quinnabog. It has the name of Willamantik while passing through Stafford, and between Tolland and Willington, Coventry and Mansfield. Below Windham it takes the name of Shetucket, and empties as above. These rivers are fed by numberless brooks from every part of the adjacent country. At the mouth of Shetucket is a bridge of timber 124 feet in length, supported at each end by pillars, and held up in the middle by braces on the top, in the nature of an arch.

Harbours.

The two principal harbours are at New London and New Haven. The former opens to the south. From the light-house, which stands at the mouth of the harbour, to the town, is about three miles; the breadth is three quarters of a mile, and in some places more. The harbour has from five to six fathoms water—a clear bottom—tough ooze, and as far as one mile above the town is entirely secure and commodious for large ships. New Haven harbour is greatly inferior to that of New London. It is a bay which sets up northerly from the sound about four miles. Its entrance is about half a mile wide. It has very good anchorage, and two and an half fathoms at low water, and three fathoms and four feet at common tides. The whole of the sea coast is indented with harbours, many of which are safe and commodious, but are not sufficiently used to merit a description.

3
Climate,
soil, and
produc-
tions.

Connecticut, though subject to the extremes of heat and cold in their seasons, and to frequent sudden changes, is very healthful. As many as one in 46 of the inhabitants of Connecticut, who were living in 1774, were upwards of 70 years old. From accurate calculation it is found, that about one in eight live to the age of 70 years and upwards; one in 13 to the age of 80 years, and one in about 30 to the age of 90.

In the maritime towns the weather is variable, according as the wind blows from the sea or land. As you advance into the country, the sea breezes have less effect upon the air, and consequently the weather is less variable. The shortest day is 8 hours and 58 minutes, and the longest 15 hours. The northwest winds, in the winter-season, are often extremely severe and piercing, occasioned by the great body of snow which lies concealed from the dissolving influence of sun in the immense forests north and northwest. The

clear and serene temperature of the sky, however, makes amends for the severity of the weather, and is favourable to health and longevity. Connecticut is generally broken land, made up of mountains, hills, and valleys; and is exceedingly well watered. Some small parts of it are thin and barren. It lies in the fifth and sixth northern climates, and has a strong fertile soil. Its principal productions are Indian corn, rye, wheat in many parts of the state, oats and barley, which are heavy and good, and of late buck-wheat—flax in large quantities—some hemp, potatoes of several kinds, pumpkins, turnips, peas, beans, &c. &c. fruits of all kinds, which are common to the climate. The soil is very well calculated for pasture and mowing, which enables the farmers to feed large numbers of neat cattle and horses. Actual calculation has evinced, that any given quantity of the best mowing land in Connecticut, produces about twice as much clear profit as the same quantity of the best wheat land in the state of New York. Many farmers, in the eastern part of the state, have lately found their advantage in raising mules, which are carried from the ports of Norwich and New London to the West India islands, and yield a handsome profit. The beef, pork, butter, and cheese of Connecticut, are equal to any in the world.

4
Trade.

The trade of Connecticut is principally with the West India islands, and is carried on in vessels from 60 to 140 tons. The exports consist of horses, mules, oxen, oak staves, hoops, pine boards, oak planks, beans, Indian corn, fish, beef, pork, &c. Horses, live cattle, and lumber, are permitted in the Dutch, Danish, and French ports. Beef and fish are liable to such heavy duties in the French islands, as that little profit arises to the merchant who sends them to their ports. Pork and flour are prohibited. As the ordinance making free ports in the French West India islands extends to all foreigners, the price of molasses and other articles has been greatly enhanced by the English purchases for Canada and Nova Scotia; so that the trade of Connecticut with the French West India Islands is not profitable. Cotton, cocoa, indigo, and sugars, are not permitted to be brought away by Americans. The severity with which these prohibitory laws are administered is such, as that these articles cannot be smuggled.

Connecticut has a large number of coasting vessels employed in carrying the produce of the state to other states.—To Rhode Island, Massachusetts, and New Hampshire, they carry pork, wheat, corn, and rye. To North and South Carolinas and Georgia, butter, cheese, salted beef, tyder, apples, potatoes, hay, &c. and receive in return rice, indigo, and money. But as New York is nearer, and the state of the markets always well known, much of the produce of Connecticut, especially of the western parts, is carried there; particularly pot and pearl ashes, flax-seed, beef, pork, cheese, and butter, in large quantities. Most of the produce of Connecticut river, from the parts of Massachusetts, New Hampshire, and Vermont, as well as of Connecticut, which are adjacent, goes to the same market. Considerable quantities of the produce of the eastern parts of the state are marketed at Boston and Providence.

The value of the whole exported produce and commodities from this state, before the year 1774, was then estimated at about L. 200,000 lawful money annually.

Connecticut.

nually. Since this time no accurate estimate has been made, so that it is impossible to tell whether the amount has since been increased or diminished.

In 1774, the number of shipping in Connecticut was 189; their tonnage 10,317; seafaring men 1162; besides upwards of 20 sail of coasting vessels, which employed about 90 seamen. This state is not yet fully recovered the confusion in which it was involved by the late war; so that the number of shipping, &c. has not, at any period since 1774, been ascertained with accuracy. It is propable, however, considering the losses sustained by the war, the decay of the ship-building business, and the number of unfortunate shipwrecks, and losses by hurricanes in the West Indies, that the shipping and seamen are not now so numerous as in 1774.

5
Manufac-
tures.

The number of shipping from the port of New London employed in 1788 in the European and West India trade, was four ships, one snow, 54 brigantines, 32 schooners, and 45 sloops. The number of horses and cattle exported from the district round New London, from the 10th of January 1787 to the 10th of January 1788, was 6917; besides jack-asses imported and exported, not included. From 1786 to 1787, the number was 6671; so that the last year exceeded the other 246. From March 1787 to January 1788, 1454 horses, 700 oxen, and 23 cows, were exported from the port of Middleton.

The farmers in Connecticut and their families are mostly clothed in plain, decent, homespun cloth. Their linens and woollens are manufactured in the family way; and although they are generally of a coarser kind, they are of a stronger texture, and much more durable than those imported from France and Great Britain. Many of their cloths are fine and handsome.

In New Haven is a linen manufactory which flourishes, and one for cotton is about to be established. In East Hartford is a glass-work, a snuff and powder mill, and an iron-work and slitting-mill. Iron works are established also at Salisbury, Norwich, and other parts of the state. At Stafford is a furnace at which is made large quantities of hollow ware and other ironmongery, sufficient to supply the whole state. Paper is manufactured at Norwich, Hartford, New Haven, and in Litchfield county. Nails of every size are made in almost every town and village in Connecticut; so that considerable quantities can be exported to the neighbouring states, and at a better rate than they can be had from Europe. Ironmongery, hats of the best kinds, candles, leather, shoes, and boots, are manufactured in this state. We must not omit to mention wooden dishes and other wooden ware, which are made in vast quantities in Suffield and some few other places, and sold in almost every part of the eastern states. Oil-mills, of a new and very ingenious construction, have been erected in several parts of the state.

It appears from experiments made formerly in this state, that a bushel of sun-flower seed yields a gallon of oil; and that an acre of ground planted with the seed at three feet apart, will yield between forty and fifty bushels of the seed. This oil is as mild as sweet oil, and is equally agreeable with sallads, and as a medicine. It may, moreover, be used with advantage in paints, varnishes, and ointments. From its being ma-

nufactured in our own country, it may always be procured and used in a fresh state. The oil is pressed from the seed in the same manner that cold drawn linseed oil is obtained from flax-seed, and with as little trouble. Sweet olive oil sells for six shillings a quart. Should the oil of the sun-flower sell for only two-thirds of that price, the produce of an acre of ground, supposing it to yield only 40 bushels of the seed, will be L. 32, a sum far beyond the product of an acre of ground in any kind of grain. The seed is raised with very little trouble, and grows in land of moderate fertility. It may be gathered and shelled, fit for the extraction of the oil, by women and children.

Connecticut is divided into eight counties, viz. Hartford, New Haven, New London, Fairfield, Windham, Litchfield, Middlesex, and Tolland. The counties are subdivided into upwards of 80 townships; each of which is a corporation, invested with power to hold lands, choose their own town-officers, to make prudential laws, the penalty of transgression not to exceed 20 s. and to choose their own representatives to the general assembly. The townships are generally divided into two or more parishes, in each of which is one or more places for public worship.

Connecticut is the most populous, in proportion to its extent, of any of the thirteen states. It is laid out in small farms from 50 to 300 or 400 acres each, which are held by the farmers in fee simple; and are generally cultivated as well as the nature of the soil will admit. The state is chequered with innumerable roads or highways, crossing each other in every direction. A traveller in any of these roads, even in the most unsettled parts of the state, will seldom pass more than two or three miles without finding a house or cottage, and a farm under such improvements as to afford the necessaries for the support of a family. The whole state resembles a well-cultivated garden; which, with that degree of industry that is necessary to happiness, produces the necessaries and conveniences of life in great plenty.

In 1759, the number of inhabitants in Connecticut was 130,611; in 1774, there were 197,856 souls. In 18 years, the increase was 67,245; from 1774 to 1782, the increase was but 11,294 persons. This comparatively small increase of inhabitants may be satisfactorily accounted for from the destruction of the war, and the numerous emigrations to Vermont, the western parts of New Hampshire, and other states.

The inhabitants are almost entirely of English descent. There are no Dutch, French, or Germans, and very few Scotch or Irish people, in any part of New England.

In addition to what has been already said on these particulars under New England, it may be observed, that the people of Connecticut are remarkably fond of having all their disputes, even those of the most trivial kind, settled according to law. The prevalence of this litigious spirit affords employment and support for a numerous body of lawyers. The number of actions entered annually upon the several dockets in the state, justifies the above observations. That party spirit, however, which is the bane of political happiness, has not raged with such violence in this state as in Massachusetts and Rhode-Island. Public proceedings have been conducted, generally, and especially of late,

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6
Civil divi-
sions and
population7
Character,
manners,
&c.

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late, with much calmness and candour. The people are well informed in regard to their rights, and judicious in the methods they adopt to secure them.

The clergy, who are numerous, and, as a body, very respectable, have hitherto preserved a kind of aristocratical balance in the very democratical government of the state; which has happily operated as a check upon the overbearing spirit of republicanism. It has been lamented that the unhappy religious disputes which have too much prevailed among some of the clergy, and the too great attention that others have paid to their temporal concerns, to the neglect of their flocks, and an inattention to the qualifications of those who have been admitted to the sacred office, have, heretofore, considerably diminished their influence. It is a pleasing circumstance that the rage for theological disputation is abating; and greater strictness is observed in the admission of candidates to the ministry. Their influence is on the increase; and it is no doubt to be attributed, in part, to their increasing influence, that an evident reformation in the manners of the people of this state has taken place since the peace. In regard to learning and abilities, the clergy, at the present day, are equal to their predecessors at any former period.

8
Religion.

As to ecclesiastical government and discipline, each church is a separate jurisdiction, and claims authority to choose their own minister, to exercise government, and to enjoy gospel ordinances within itself. The churches, however, are not independent of each other; they are associated for mutual benefit and convenience. The associations have power to licence candidates for the ministry, to consult for the general welfare, and to recommend measures to be adopted by the churches, but have no authority to enforce them. When disputes arise in churches, councils are called, by the parties, to settle them; but their power is only advisory. There are as many associations in the state as there are counties; and they meet twice in a year. These are all combined in one general association, who meet annually.

All religions that are consistent with the peace of society are tolerated in Connecticut; and a spirit of liberality and catholicism is increasing. There are very few religious sects in this state; the bulk of the people are congregationalists. Besides these there are episcopalians and baptists; and formerly there was a society of Sandimanians at New-Haven; but they are now reduced to a very small number. The episcopalian churches are respectable, and are under the superintendence of a bishop. There were 29 congregations of the baptists in 1784. These congregations, with those in the neighbouring states, meet in associations, by delegation, annually.

9
Chief towns.

There are a great number of very pleasant towns, both maritime and inland, in Connecticut. It contains five incorporated towns or cities. Two of these, Hartford and New Haven, are the capitals of the state. The general assembly is holden at the former in May, and at the latter in October, annually. See HARTFORD and New-HAVEN.

10
Colleges, academies, and schools.

In no part of the world is the education of all ranks of people more attended to than in Connecticut. Almost every town in the state is divided into districts, and each district has a public school kept in it a greater

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or less part of every year. Somewhat more than one third of the monies arising from a tax on the polls and rateable estate of the inhabitants, is appropriated to the support of schools, in the several towns, for the education of children and youth. The law directs that a grammar school shall be kept in every county town throughout the state.

There is a grammar school at Hartford, and another at New-Haven, supported by a donation of governor Hopkins. This venerable and benevolent gentleman, in his last will, dated 1657, left in the hands of Theophilus Eaton, Esq; and three others, a legacy of L. 1324, "as an encouragement, in these foreign plantations, of breeding up hopeful youths both at the grammar school and college." In 1664, this legacy was equally divided between New-Haven and Hartford; and grammar schools were erected, which have been supported ever since.

At Greenfield there is a respectable academy, under the care and instruction of the Rev. Dr Dwight. At Plainfield is another, under the care of the Rev. Mr Benedict. This academy has flourished for several years, and furnished a number of students for Yale and Dartmouth colleges. At Norwich and Windham, likewise, are academies furnished with able instructors; each of these academies have 60 or 70 scholars.

Yale College was founded in 1700, and remained at Killingworth until 1707—then at Saybrook until 1716, when it was removed and fixed at New Haven. See *NEW-HAVEN*.

On the bank of Connecticut river, two miles from Middleton, is a lead mine, which was wrought during the war, at the expence of the state, and was productive. It is too expensive to work in time of peace. Copper mines have been discovered and opened in several parts of the state, but have proved unprofitable, and are much neglected. Iron mines are numerous and productive. Steel ore has been found in the mountains between Woodbury and New Milford. Talcs of various kinds, white, brown, and chocolate coloured crystals, zink or spelter, a semimetal, and several other fossils and metals, have been found in Connecticut.

All freeholders in the state are required by law to give in lists of their polls and rateable estate, to persons appointed in the respective towns to receive them, on or before the 20th of August annually. These are valued according to law, arranged in proper order, and sent to the general assembly annually in May.

The sum total of the list of the polls and rateable estate of the inhabitants of Connecticut, as brought into the general assembly in May 1787, were as follows:

Sum total of the single list	L. 1,484,901 6 4 $\frac{1}{2}$
Assessments	- 47,790 2 9
One quarter of the fourfolds,	- 1,176 9 4

Total, - L. 1,533,867 18 5 $\frac{1}{2}$

On this sum taxes are levied, so much on the pound, according to the sum proposed to be raised. A tax of two-pence on the pound would raise L. 12,782 4 s.

The ordinary annual expences of government before the war amounted to near L. 4000 Sterling, exclusive of that which was appropriated to the support of schools. The expences have since increased.

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At

Connecticut.

Connecti-
cut.13
Mineral
springs.14
Constitu-
tion and
courts of
justice.

At Stafford is a medicinal spring, which is said to be a sovereign remedy for scorbutic, cutaneous, and other disorders. At Guilford is a spring, whose water, it is said, when separated from the fountain, will evaporate even when put into a bottle and tightly corked.

It is difficult to say what is the constitution of this state. Contented with the form of government which originated from the charter of Charles II. granted in 1662, the people have not been disposed to run the hazard of framing a new constitution since the declaration of independence. They have tacitly adopted their old charter as the ground of civil government, so far as it is applicable to an independent people.

Agreeable to this charter, the supreme legislative authority of the state is vested in a governor, deputy-governor, twelve assistants or counsellors, and the representatives of the people, styled the *General Assembly*. The governor, deputy-governor, and assistants, are annually chosen by the freemen in the month of May. The representatives (their number not to exceed two from each town) are chosen by the freemen twice a year, to attend the two annual sessions, on the second Thursdays of May and October. This assembly has power to erect judicatories, for the trial of causes civil and criminal, and to ordain and establish laws for settling the forms and ceremonies of government. By these laws the general assembly is divided into two branches, called the upper and lower houses. The upper house is composed of the governor, deputy-governor, and assistants; the lower house, of the representatives of people. No law can pass without the concurrence of both houses. The judges of the superior court hold their offices during the pleasure of the general assembly. The judges of the county courts, and justices, are annually appointed. Sheriffs are appointed by the governor and council, without limitation of time. The governor is captain-general of the militia, the deputy-governor lieutenant-general. All other military offices are appointed by the assembly, and commissioned by the governor.

The mode of electing the governor, deputy-governor, assistants, treasurer, and secretary, is as follows: The freemen in the several towns meet on the Monday next after the first Tuesday in April, annually, and give in their votes for the persons they choose for the said offices respectively, with their names written on a piece of paper, which are received and sealed up by a constable in open meeting, the votes for each office by themselves, with the name of the town and office written on the outside. These votes, thus sealed, are sent to the general assembly in May, and there counted by a committee from both houses. All freemen are eligible to any office in government. In choosing assistants, twenty persons are nominated, by the vote of each freeman, at the freemens meeting for choosing representatives in September annually. These votes are sealed up, and sent to the general assembly in October, and are there counted by a committee of both houses, and the twenty persons who have the most votes stand in nomination; out of which number the twelve who have the greatest number of votes, given by the freemen at their meeting in April, are in May declared assistants in the manner above mentioned. The qualifications of freemen are, maturity in years,

quiet and peaceable behaviour, a civil conversation, and freehold estate to the value of forty shillings *per annum*, or forty pounds personal estate in the list, certified by the select men of the town; it is necessary also that they take the oath of fidelity to the state. Their names are enrolled in the town clerk's office, and they continue freemen for life, unless disfranchised by sentence of the superior court, on conviction of misdemeanor.

The courts are as follows: The justices of the peace, of whom a number are annually appointed in each town by the general assembly, have authority to hear and determine civil actions, where the demand does not exceed four pounds. If the demand exceeds forty shillings, an appeal to the county is allowed. They have cognizance of small offences, and may punish by fine not exceeding forty shillings, or whipping not exceeding ten stripes, or sitting in the stocks. There are eight county courts in the state, held in the several counties by one judge and four justices of the quorum, who have jurisdiction of all criminal cases, arising within their respective counties, where the punishment does not extend to life, limb, or banishment. They have original jurisdiction of all civil actions which exceed the jurisdiction of a justice. Either party may appeal to the superior court, if the demand exceeds twenty pounds, except on bonds or notes vouched by two witnesses.

There are several courts of probate in each county, consisting of one judge. The peculiar province of this court is, the probate of wills, granting administration of intestate estates, ordering distribution of them, and appointing guardians for minors, &c. An appeal lies from any decree of this court to the superior court.

The superior court consists of five judges. It has authority in all criminal cases extending to life, limb, or banishment, and other high crimes and misdemeanors, to grant divorces, and to hear and determine all civil actions brought by appeal from the county courts, or the court of probate, and to correct the errors of all inferior courts. This is a circuit court, and has two stated sessions in each county annually. The superior and county courts try matters of fact by a jury, or without if the parties will agree.

There is a supreme court of errors, consisting of the deputy-governor and the twelve assistants. Their sole business is to determine writs of error brought on judgments of the superior court, where the error complained of appears on the record. They have two stated sessions annually, viz. on the Tuesdays of the weeks preceding the stated sessions of the general assembly.

The county court is a court of chancery, empowered to hear and determine cases in equity, where the matter in demand does not exceed one hundred pounds. The superior court has cognizance of all cases where the demand exceeds that sum. Error may be brought from the county to the superior court, and from the superior court to the supreme court of errors, on judgment in cases of equity as well as of law.

The general assembly only have power to grant pardons and reprieves, to grant commissions of bankruptcy, or protect the persons and estates of unfortunate debtors.

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The common law of England, so far as it is applicable to this country, is considered as the common law of this state. The reports of adjudication in the courts of king's bench, common pleas, and chancery, are read in the courts of this state as authorities; yet the judges do not consider them as conclusively binding, unless founded on solid reasons which will apply in this state, or sanctioned by concurrent adjudications of their own courts.

The feudal system of descents was never adopted in this state. All the real estate of intestates is divided equally among the children, males and females, except that the eldest son has a double portion. And all estates given in tail, must be given to some person then in being, or to their immediate issue, and shall become fee-simple estates to the issue of the first donee in tail. The widow of an intestate is intitled to a third part of the personal estate for ever, and to her dower, or third part of the houses and lands belonging to the intestate at the time of his death, during her life.

15
Practice of
law.

The practice of law in this state has more simplicity, but less precision, than in England. Assistants and judges are empowered to issue writs through the state, and justices through their respective counties. In these writs, the substance of the complaints or the declarations must be contained; and if neither of the parties show good reason for delay, the causes are heard and determined the same term to which the writs are returnable. Few of the fictions of law, so common in the English practice, are known in this state. The plaintiff always has his election to attach or summon the defendant. Attornies are admitted and qualified by the county courts. Previous to their admission to the bar, they must study two years with a practising attorney in the state, if they have had a college education, and three years if they have not; their morals must be good, and their characters unblemished; and they must sustain an examination by the attorneys of the court of the county where they are admitted, and be by them recommended to the court. When admitted to the county court, they can practise, without other qualifications, in any court in the state. There are upon an average about thirteen attornies to each county, one hundred and four in the state; a very great proportion for the real exigencies of the people. Yet from the litigious spirit of the citizens, the most of them find employment and support. There is no attorney general, but there is one attorney to the state in each county.

16
History.

The present territory of Connecticut, at the time of the first arrival of the English, was possessed by the Pequot, the Mohegan, Podunk, and many other smaller tribes of Indians.

The Pequots were numerous and warlike. Their country extended along the sea-coast from Paukatuk to Connecticut river. About the year 1630, this powerful tribe extended their conquests over a considerable part of Connecticut, over all Long Island, and part of Narragansett. Sassacus, who was the grand monarch of the whole country, was king of this nation. The seat of his dominion was at New London; the ancient Indian name of which was Pequot.

The Mohegans were a numerous tribe, and their territory extensive. Their ancient claim, which was

surveyed and settled by commissioners from Queen Anne in 1705, comprehended all New London county, except a narrow strip of about eight miles wide, on the sea-coast, almost the whole of the county of Windham, and a part of the counties of Tolland and Hartford. Uncas, distinguished for his friendship to the English, was the Sachem of this tribe.

The Podunks inhabited East Hartford, and the circumjacent country. The first Sachem of this tribe, of whom the English had any knowledge, was Tanimoo. He was able to bring into the field more than 200 fighting men.

The first grant of Connecticut was made by the Plymouth council to the earl of Warwick, in 1630, and confirmed by his majesty in council the same year. This grant comprehended all that part of New England which lies west from Narragansett river, 120 miles on the sea coast, from thence, in latitude and breadth aforesaid, to the south sea. The year following, the earl assigned this grant to lord Say and Seal, lord Brook, and nine others.

No English settlements were attempted in Connecticut until the year 1633, when a number of Indian traders, having purchased of Zequasson and Natawanute, two principal Sachems, a tract of land at the mouth of Little river in Windsor, built a house and fortified it, and ever after maintained their right of soil upon the river.

The same year, a little before the arrival of the English, a company of Dutch traders came to Hartford, and built a house which they called the *Hirfe of Good Hope*, and erected a small fort, in which they planted two cannon. The remains of this settlement are still visible on the bank of Connecticut river. This was the only settlement of the Dutch in Connecticut in these ancient times. The Dutch, and after them the province of New York, for a long time claimed as far east as the western bank of Connecticut river. It belongs to the professed historian to prove or disprove the justice of this claim. Douglas says, "The partition line between New York and Connecticut, as established December 1. 1664, run from the mouth of Memorocok river, a little west from Byram river, N. N. W. and was the ancient easterly limits of New York, until November 23. 1683, when the line was run nearly the same as it is now settled." If Douglas is right, the New York claim could not have been well founded.

In 1634, Lord Say and Seal, &c. sent over a small number of men, who built a fort at Saybrook, and held a treaty with the Pequot Indians, who in a formal manner gave to the English their right to Connecticut river and the adjacent country.

In 1635, the Plymouth council granted to the Duke of Hamilton, all lands between Narragansett and Connecticut rivers, and back into the country as far as Massachusetts south line. This covered a part of the Earl of Warwick's patent, and occasioned some disputes in the colony. There were several attempts to revive the Hamilton claim, but were never prosecuted.

In October of this year, about sixty persons from Newtown, Dorchester, and Watertown, in Massachusetts, came and settled at Hartford, Wethersfield, and Windsor, in Connecticut; and the June following the

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famous Mr Hooker and his company came and settled at Hartford, and was a friend and father to the colony to the day of his death.

The first court held in Connecticut was at Hartford, April 26. 1636.

The year 1637 was distinguished by the war with the Pequots. This warlike nation had, for some time, been troublesome neighbours. They solicited the Narragansetts to join them in extirpating the English. They had surprized and killed several of the English upon Connecticut river. These threatening appearances and actual hostilities induced the three colonies of Massachusetts, Plymouth, and Connecticut, to combine their forces, to carry the war into their country, and to attempt the entire destruction of the whole tribe. Myantonomo, the Narragansett Sachem, and Uncas, Sachem of the Mohegans, sent to the English and offered their service to join with them against the Pequots. Forces were accordingly raised in all the colonies; but those of Connecticut, on account of their vicinity to the enemy, were first in action. Captain Mason, with 80 English and 100 Indians from Connecticut river, proceeded by water to the Narragansett's country, where 200 of that tribe joined him. On the 24th of May, they began their march for Sasacus fort on Pequot, now Thames river. They afterwards determined first to assault Mystic fort, which was situated between them and Pequot river. On the morning of the 26th of May the attack was made. The Indians, after a midnight revel, were buried in a deep sleep. At the moment of their approach, the centinel happened to be gone into a wigwam to light his pipe. The barking of a dog gave the alarm. The Indians awoke, seized their arrows, and began their hideous yell. They were joined in their tremendous noise by the Indians in the English army, who were in the rear and afraid to approach. The battle was warm and bloody, and the victory complete. The fort was taken—about 70 wigwams burnt—50 or 60 of the Indians were killed—many were wounded and taken, and the rest escaped. Sasacus and his warriors at Pequot, struck with terror at the news of this defeat, demolished their principal fort, burnt their wigwams, and fled to the westward. Capt. Stoughton, with 160 men from Massachusetts, had by this time arrived at Saybrook. He with his forces joined Captain Mason and pursued the Indians, and overtook and surrounded them in a great swamp near Fairfield. A Sachem and ninety-nine women and children came out and delivered themselves up to their pursuers. Terms of peace were offered to the rest: but after a short parley they determined, that as they had lived they would die together. There were about 80 who made this resolution. Part of these escaped by means of the darkness of the night. The rest were either killed or taken. In this action the Indians had guns, which is the first account of their having used them. Sasacus fled to the Mohawks, by whom it is reported he was murdered; but it is more probable that he and his company incorporated with them. Many of the Indian captives were unjustifiably sent to Bermudas and sold for slaves. The Pequot tribe was wholly extinguished. This successful expedition struck the Indians that remained with such terror, as restrained them from open hostilities for near forty years after.

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The English thus obtained the country east of the Dutch settlements, by right of conquest. The pursuit of the Indians led to an acquaintance with the lands on the sea coast from Saybrook to Fairfield. It was reported to be a very fine country. This favourable report induced Messrs Eaton and Hopkins, two very respectable London merchants, and Mr Davenport, a man of distinguished piety and abilities, with their company, who arrived this year (1637) from London, to think of this part of the country as the place of their settlement. Their friends in Massachusetts, sorry to part with so valuable a company, dissuaded them from their purpose. Influenced, however, by the promising prospects which the country afforded, and flattering themselves that they should be out of the jurisdiction of a general governor, with which the country was from time to time threatened, they determined to proceed. Accordingly, in March 1638, with the consent of their friends on Connecticut river, they settled at New Haven, and laid the foundation of a flourishing colony, of which Quinnipiac, now New Haven, was the chief town. The first public worship, in this new plantation, was attended on Lord's day, April 18. 1638, under a large spreading oak. The Rev. Mr Davenport preached from Matt. iii. 1. on the temptations of the wilderness. Both colonies, by voluntary compact, formed themselves into distinct commonwealths, and remained so until their union in 1665.

In 1639, the three towns on Connecticut river, already mentioned, finding themselves without the limits of any jurisdiction, formed themselves into a body politic, and agreed upon articles of civil government. These articles were the foundation of Connecticut charter, which was granted in 1662. The substance of the articles, so far as they respect the holding of assemblies, the time and manner of electing magistrates and other civil officers (except that in the old confederation no person was to be chosen governor more than once in two years), and the extent of legislative powers, was transferred into, and established in said charter.

The first church was gathered in New Haven this year, and consisted of seven members. These were chosen by the settlers after Mr Davenport had preached from the words of Solomon, 'Wisdom hath builded her house, she hath hewed out her seven pillars.' These men were indeed the pillars of the church, to whom the rest were added as they became qualified. They were also the court to try all civil actions.

The first settlers in New Haven had all things common; all purchases were made in the name and for the use of the whole plantation; and the lands were apportioned out to each family according to their number and original stock.

At their first election, in October 1639, Mr Theophilus Eaton was chosen governor for the first year. Their elections, by agreement, were to be annual; and the word of God their only rule in conducting the affairs of government in the plantation.

In 1643, the articles of confederation between the four New England colonies, mentioned under the article NEW ENGLAND, were unanimously adopted by the colonies of New Haven and Connecticut.

The English settlement on Delaware, which was under

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under the jurisdiction of New Haven, was surprised by the Swedes, and the people put in irons, under a false pretence that they were entering into a conspiracy with the Indians to extirpate the Swedes.

The general court of New Haven, this year, established it as a fundamental article not to be disputed, That none be admitted as free burgeses but church members, and that none but such should vote at elections. They also ordained, That each town choose from among themselves judges (church members) to be a court, to have cognizance of all civil actions not exceeding twenty pounds; and of criminal causes, where the punishment was, sitting in the stocks, whipping, and fining not exceeding five pounds. There was liberty of appeal from this to the court of magistrates. The court of magistrates consisted of all the magistrates throughout the colony, who were to meet twice a-year at New Haven, for the trial of all capital causes. Six made a quorum. The general court was to consist of the governor, deputy-governor, magistrates, and two representatives from each town. The annual election of officers of government was at this time established, and has ever since continued.

The unsettled state of the colony had hitherto prevented their establishing a code of laws. To supply this defect, the general court ordered, 'That the judicial laws of God, as they were delivered to Moses, and as they are a fence to the moral, being neither typical nor ceremonial, nor having any reference to Canaan, shall be accounted of moral equity, and generally bind all offenders, and be rule to all the courts in this jurisdiction in their proceedings against offenders, until they be branched out into particulars hereafter.'

About this time a war broke out between the Mohegan and Narragansett Indians. A personal quarrel between Myantonomo, sachem of the Narragansetts, and Uncas sachem of the Mohegans, was the foundation of the war. Myantonomo raised an army of 900 warriors, and marched towards the Mohegan country. Uncas by his spies received timely notice of their approach. His seat of residence was in some part of Norwich. He quickly collected 600 of his bravest warriors, and told them, 'The Narragansetts must not come into our town; we must meet them.' They accordingly marched about three miles to a large plain, where the two armies met, and halted within bow-shot of each other. A parley was proposed by Uncas, and agreed to by Myantonomo. The sachems met, and Uncas addressed his enemy as follows. 'You have a great many brave men: so have I. You and I have quarrelled; but these warriors, what have they done? Shall they die to avenge a private quarrel between us? No. Come like a brave man, as you pretend to be, and let us fight. If you kill me, my men shall be yours; if I kill you, your men shall be mine.' Myantonomo replied: 'My men came to fight, and they shall fight.' Uncas, like an experienced warrior, aware of the result of the conference from the superior force of his enemy, had previously signified to his men, that if Myantonomo refused to fight him in single combat, he would immediately fall, which was to be the signal for them to begin the attack. As soon therefore as Myantonomo had finished his laconic speech, Uncas dropped: his men instantly obeyed the

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signal, and poured in a shower of arrows upon the unsuspecting Narragansetts, and rushing on with their horrid yells and savage fierceness, put them to flight. Many were killed on the spot, the rest were closely pursued, and some were precipitately driven down craggy precipices, and dashed in pieces. At a place called, from this event, *Sachem's plain*, Uncas overtook and seized Myantonomo by the shoulder. They sat down together; and Uncas with a hoop called in his men, and the battle ceased. Doubtful what to do with the royal prisoner, Uncas and his warriors, in council, determined to carry him to the governor and council at Hartford, and be advised by them. Thither he was accordingly conducted. The governor having advised with his council, told Uncas, that the English were not then at war with the Narragansetts, and of course that it was not proper for them to intermeddle in the matter. Uncas was left to do with him as he pleased. Myantonomo was conducted back to the plain where he was taken, and put to death by Uncas himself. The tragic scene did not end with his death. Uncas, after the manner of the Indians, with his tomahawk cut off a large piece of flesh from the shoulder of his slaughtered enemy, broiled and eat it, saying, with an air of savage triumph, 'It is the sweetest meat I ever eat. It makes me have a stout heart.' His body was afterwards buried, and a pillar erected over it, the remains of which are visible to this day.

The Narragansetts were greatly enraged at the death of their prince, and resolved to take vengeance on the Mohegans. The united colonies interposed to prevent a war between them, but in vain. The Narragansetts resolutely declared, they would continue the war until they had Uncas's head. But as Uncas had ever been a friend to the English, they joined him against his enemies, and were victorious. Such, however, was the enmity of the Narragansetts to the English, that they afterwards sent some of their men to Uncas, with large presents, to induce him to join with them in a war with the colonies. Uncas replied, 'Go tell your king, that I will go to Norwich, and advise with Major John Mason and Mr Fitch; if they tell me to join him and fight against the English, I will join him.' In the war that happened soon after, Uncas assisted the English, and the Narragansetts were subdued, and never after were formidable.

In consideration of the success and increase of the New England colonies, and that they had been of no charge to the nation, and in prospect of their being in future very serviceable to it, the English parliament, March 10. 1643, granted them an exemption from all customs, subsidies, and other duties, until further order.

In 1644, the Connecticut adventurers purchased of Mr Fenwick, agent for Lord Say and Seal, and Lord Brook, their right to the colony of Connecticut, for L. 1600.

The history of Connecticut is marked with traces of the same spirit which has been mentioned as characteristic of the Massachusetts, in different stages of their history. Indeed, as Massachusetts was the stock whence Connecticut proceeded, this is to be expected.

The colonies of Connecticut and New Haven, from their first settlement, increased rapidly; tracts of land were

Connecticut.

were purchased of the Indians, and new towns settled from Stamford to Stonington, and far back into the country, when, in 1661, Major John Mason, as agent for the colony, bought of the natives all lands which had not before been purchased by particular towns, and made a public surrender of them to the colony, in the presence of the general assembly. Having done these things, the colonies petitioned King Charles II. for a charter, and their petition was granted. His Majesty, on the 23d of April 1662, issued his letters patent under the great seal, ordaining that the colony of Connecticut should for ever hereafter be one body corporate and politic, in fact and in name, confirming to them their ancient grant and purchase, and fixing their boundaries as follows, viz. "All that part of his Majesty's dominions in New England, in America, bounded east by Narragansett river, commonly called *Narragansett bay*, where the river falleth into the sea; and on the north by the line of Massachusetts plantation, and on the south by the sea, and in longitude as the line of the Massachusetts colony, running from east to west, that is to say, from the said Narragansett bay on the east, to the south sea on the west part, with the islands thereunto belonging." This charter has ever since remained the basis of the government of Connecticut.

Such was the ignorance of the Europeans respecting the geography of America, when they first assumed the right of giving away lands which the God of nature had long before given to the Indians, that their patents extended they knew not where, many of them were of doubtful construction, and very often covered each other in part, and have produced innumerable disputes and mischiefs in the colonies, some of which are not settled to this day. Connecticut construed her charter literally, and passing over New York, which was then in possession of the subjects of a Christian prince, claimed, in latitude and breadth mentioned therein, to the South Sea. Accordingly purchases were made of the Indians, on the Delaware river, west of the western bounds of New York, and within the supposed limits of Connecticut charter, and settlements were made thereon by people from, and under the jurisdiction of, Connecticut. The charter of Pennsylvania, granted to William Penn, in 1681, covered these settlements. This laid the foundation for a dispute, which for a long time was maintained with warmth on both sides. The matter was at last submitted to gentlemen chosen for the purpose, who decided the dispute in favour of Pennsylvania. Many, however, still assert the justice of the Connecticut claim. The state of Connecticut has lately ceded to Congress all their lands west of Pennsylvania, except a reserve of 20 miles square. This cession Congress have accepted, and thereby indubitably established the right of Connecticut to the reserve.

The colony of New Haven, though unconnected with the colony of Connecticut, was comprehended within the limits of their charter, and, as they concluded, within their jurisdiction. But New Haven remonstrated against their claim, and refused to unite with them until they should hear from England. It was not until the year 1665, when it was believed that the king's commissioners had a design upon the New England charters, that these two colonies

formed a union, which has ever since amicably subsisted between them. Connecticut.

In 1672, the laws of the colony were revised, and the general court ordered them to be printed; and also, that "every family should buy one of the law books; such as pay in silver, to have a book for 12d. such as pay in wheat, to pay a peck and half a book; and such as pay in pease, to pay 2s. a book, the pease at 3s. the bushel." Perhaps it is owing to this early and universal spread of law books, that the people of Connecticut are to this day so fond of the law. In 1750, the laws of Connecticut were again revised, and published in a small folio volume of 258 pages. Dr Douglass observes, that they were the most natural, equitable, plain, and concise code of laws for plantations hitherto extant." There has been a revision of them since the peace, in which they were greatly and very judiciously simplified.

The years 1675 and 1676 were distinguished by the wars with Philip and his Indians, and with the Narragansetts, by which the colony was thrown into great distress and confusion. The inroads of the enraged savages were marked with cruel murders, and with fire and devastation.

In 1684, the charter of Massachusetts's bay and Plymouth were taken away, in consequence of Quo warrantos which had been issued against them. The charter of Connecticut would have shared the same fate, had it not been for ———— Wadsworth, Esq; who, having very artfully procured it when it was on the point of being delivered up, buried it under an oak tree in Hartford, where it remained until all danger was over, and then was dug up and reassumed.

Connecticut has ever made rapid advances in population. There have been more emigrations from this than from any of the other states, and yet it is at present full of inhabitants. This increase, under the divine benediction, may be ascribed to several causes. The bulk of the inhabitants are industrious, sagacious husbandmen. Their farms furnish them with all the necessaries, most of the conveniences, and but few of the luxuries, of life. They of course are generally temperate, and, if they choose, can subsist with as much independence as is consistent with happiness. The subsistence of the farmer is substantial, and does not depend on incidental circumstances, like that of most other professions. There is no necessity of serving an apprenticeship to the business, nor of a large stock of money to commence it to advantage. Farmers, who deal much in barter, have less need of money than any other class of people. The ease with which a comfortable subsistence is obtained, induces the husbandman to marry young. The cultivation of his farm makes him strong and healthful. He toils cheerfully through the day—eats the fruit of his own labour with a gladsome heart—at night devoutly thanks his bounteous God for his daily blessings—retires to rest, and his sleep is sweet. Such circumstances as these have greatly contributed to the amazing increase of inhabitants in this state.

Besides, the people live under a free government, and have no fear of a tyrant. There are no overgrown estates, with rich and ambitious landlords, to have an undue and pernicious influence in the election of civil officers. Property is equally enough divided, and must continue

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continued to be so as long as estates descend as they now do. No person is prohibited from voting, or from being elected into office, on account of his poverty. He who has the most merit, not he who has the most money, is generally chosen into public office. As instances of this, it is to be observed, that many of the citizens of Connecticut, from the humble walks of life, have arisen to the first offices in the state, and filled them with dignity and reputation. That base business of electioneering, which is so directly calculated to introduce wicked and designing men into office, is yet but little known in Connecticut. A man who wishes to be chosen into office, acts wisely for that end, when he keeps his desires to himself.

A thirst for learning prevails among all ranks of people in the state. More of the young men in Connecticut, in proportion to their numbers, receive a public education, than in any of the states. Dr Franklin and other literary characters have honoured this state by saying, that it is the *Athens of America*.

The revolution, which so essentially affected the governments of most of the colonies, produced no very perceptible alteration in the government of Connecticut. While under the jurisdiction of Great Britain, they elected their own governors, and all subordinate civil officers, and made their own laws in the same manner and with as little control as they now do. Connecticut has ever been a republic, and perhaps as perfect and as happy a republic as has ever existed. While other states, more monarchical in their government and manners, have been under a necessity of undertaking the difficult task of altering their old, or forming new constitutions, and of changing their monarchical for republican manners, Connecticut has uninterruptedly proceeded in her old track, both as to government and manners; and by these means has avoided those convulsions which have rent other states into violent parties.

CONNECTION, or CONNEXION, the relation or dependence of one thing upon another.

CONNECTION, or *Continuity*, in the drama, consists in the joining of the several scenes together.

The connection is said to be observed, when the scenes of an act succeed one another immediately, and are so joined as that the stage is never left empty.

CONNECTIVES, in grammar, one of the four species under which, according to Mr Harris, all words may be included. They are of two kinds: and as they connect sentences or words, are called by the different names of *conjunctions* and *prepositions*. See GRAMMAR.

CONNIVENT VALVES, in anatomy, those wrinkles, cellules, and vascules, which are found in the inside of the two intestines *ilium* and *jejunum*. See ANATOMY, n° 93. *et seq.*

CONNOISSEUR, a French term, of late used in English: it literally denotes a person well versed in any thing; being formed of the verb *connoître*, "to know, understand." Hence it comes to be used in our language for a critic, or person who is a thorough judge or master in any way, particularly in matters of painting and sculpture.

CONNOR (Bernard), a learned physician, was born in the county of Kerry, in Ireland, about the year 1666. Having determined to apply himself to the study

of physic, he went to France, and resided some time in the university of Montpellier. Afterwards he went to Paris; where he obtained great skill in medicine, anatomy, and chemistry. From thence he travelled to Venice, with the two sons of the high-chancellor of Poland; and then taking a tour through great part of Germany, went to Warsaw, where he was made physician to King John Sobieski. In 1695, he came to England, read a course of lectures in London and Oxford, and became member of the Royal Society and College of Physicians: afterwards, being invited to Cambridge, he read public lectures there, and made various experiments in chemistry. He has rendered himself memorable for a philosophical and medical treatise in Latin, intitled *Evangelium Medici*, i. e. "the Physician's Gospel;" tending to explain the miracles performed by Christ as natural events, upon the principles of natural philosophy. He wrote also a history of Poland; and died in 1698, aged 32.

CONNOR, a city of Ireland, in the county of Antrim and province of Ulster. W. Long. 6. 30. N. L. 54. 50.

CONOCARPUS, BUTTON-WOOD: A genus of the monogynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 48th order, *Aggregate*. The corolla is pentapetalous; the seeds naked, solitary, inferior; the flowers aggregate. There are two species, the erecta and procumbens, both natives of the West Indies. They rise to the height of about 16 feet, but are trees of no beauty, nor is the wood of them used for any mechanic purpose in the countries where they grow naturally. They are, however, preserved in some botanic gardens in Britain for the sake of variety.

CONOID, in geometry, a solid body, generated by the revolution of a conic section about its axis. See CONIC Sections.

CONOIDES, in anatomy, a gland found in the third ventricle of the brain, called *pinealis*, from its resemblance to a pine-apple. See ANATOMY, n° 132.

CONON, the renowned Athenian general and admiral, flourished 394 years before Christ. See ATTICA, n° 162, 163. After his defeat by Lyfander, he fled to Evagoras king of Cyprus: after which he put himself under the protection of Artaxerxes king of Persia; with whose army he delivered Athens from the oppression of strangers, and rebuilt its walls. In the 360th year of Rome, he beat the Lacedemonians in a sea-fight near Cnidus upon the coast of Asia, deprived them of the sovereign rule they had on sea ever since the taking of Athens, and had some other considerable advantages over them: but falling into the hands of Teribazus a Persian, who envied his glory, he was put to death.

CONORS, in zoology: a genus of insects belonging to the order diptera, the characters of which are: The rostrum is porrected, and jointed like a knee. The antennæ terminate by a flat and solid articulation, resembling the bowl of a spoon, with a lateral bristle, which when closely examined appears to be very hairy. Of this genus there are several species. 1. The calcitrans is to be found every where, especially in autumn, when it harasses the horses, and draws blood from them with its sting. 2. The macrocephala might at first sight be mistaken for a species of wasp.

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wasp. It is smooth; the forepart of the head is lemon-colour, as are the poisers; the feet are dun-coloured. The thorax is variegated with black and reddish dun. The same takes place with respect to the segments of the abdomen; some of which are edged with lemon-colour, chiefly the second, and part of the third, towards the sides. The wings are brown, watered, and clouded. This beautiful conops is found in meadows. There are eleven or twelve other species.

CONOVIVM (anc. geog.) a town of the Ordovices, in Britain. From its ruins arose, at the distance of four miles, *Aberconwey*, the mouth of the Conwey, in Caernarvonshire; and on the spot where *Conoveum* stood is an hamlet, called *Carbean*, the old town (Camden.)

CONQUEST, is civil jurisprudence, is the acquisition of property in common by a number of persons.

In some countries they confound acquisition with conquest; but, according to the most general acceptance, acquisition is the gaining of unappropriated goods before the establishment of a community: whereas by the term *conquest*, is ordinarily intended whatever is acquired by a number of persons in community; or by some one for all the others. As it is more especially in the union of persons by marriage that a community of property takes place; so it is in reference to them that we frequently use the word *conquest*. There are nevertheless conquests also among other persons who are in a tacit community or society; such as obtain by particular local customs. According to this sense of the word, it has been contended by several, that William I. claimed this kingdom; that is, not by right of arms, but by right of conquest or acquiescence; under promise of succession made by Edward the Confessor, and a contract entered into by Harold to support his pretensions to that succession: and by old writers, *conquestus*, *acquisitio*, and *perquisitio*, are frequently used as synonymous terms.

CONQUEST, in the law of nations, is the acquisition of sovereignty by force of arms, by some foreign prince; who reduces the vanquished under his empire. The right of conquest is derived from the laws of war; and when a people is subjected, the conduct of the conqueror is regulated by four kinds of law. First, the law of nature, which dictates whatever tends to self-preservation; secondly, our reason, which teaches us to use others as we would be treated ourselves; thirdly, the laws of political society, to which nature has not assigned any precise boundary; lastly, the law which is derived from the particular circumstances attending the conquest. Thus, a state conquered by another will be treated in one of the four methods following: Either the conqueror will continue it under its own laws, and will only claim the exercise of civil and ecclesiastical sovereignty; or he will impose a new form of government; or he will destroy the frame of their society, and incorporate the inhabitants with others; or he will exterminate them.

CONRAD II. elected emperor of Germany in 1004. He was obliged to take the field against most of the German dukes who had revolted from him; and he put Ernest duke of Suabia under the ban of the em-

pire. This being one of the earliest instances of such a proscription, the formula is inserted here for its singularity. "We declare thy wife a widow, thy children orphans; and we send thee, in the name of the devil, to the four corners of the world." It was in the reign of this prince that the German fiefs became hereditary. He died in 1039.

CONRAD III. emperor of Germany in 1138. The duke of Bavaria opposed his election, and being put under the ban of the empire, and deprived of his duchy, he could not survive his disgrace. The margrave of Austria was ordered by the Emperor to take possession of Bavaria; but *Welfi*, uncle to the deceased Duke, attacked him, and was defeated near the castle of Wimburch: the battle fought upon this occasion is famous in history, as having given rise to the party names of *Guelphs* and *Gibbelines*, afterwards assumed in Italy. The parole of the day with the Bavarians was *Welfi*, from the name of their general; that of the Imperialists *Werblingen* from a small village where Frederic duke of Suabia, their commander, had been nursed: by degrees these names served to distinguish the two parties; and the Italians, who could not accustom themselves to such rough words, formed from them their *Guelphs* and *Gibbelines*. He died in 1152.

CONRAD of Lichtenau, or Abbas Uspergensis, was author of an Universal Chronology from the creation to 1229, continued by an anonymous writer to Cha. V. He collected a fine library, and died about the year 1240.

CONRADIN, or CONRAD junior, son of Conrad IV. was acknowledged Emperor by the Gibbelines, who received him in triumph at Rome: but Pope Alexander IV. had published a crusade against this orphan; and Urban VII. his successor, gave the empire to Charles of Anjou, brother to Louis IX. king of France; and the unfortunate youth, though powerfully supported even by the Turks, lost a battle, in which he was taken prisoner, and was beheaded, by order of his base opponent, publicly at Naples in 1269, in the 18th year of his age. In him ended the race of the dukes of Suabia, which had produced several kings and emperors.

CONSANGUINITY, or KINDRED, is defined by the writers on these subjects to be, *vinculum personarum ab eodem stipite descendit*; "the connection or relation of persons descended from the same stock or common ancestor." This consanguinity is either lineal or collateral.

Lineal consanguinity is that which subsists between persons of whom one is descended in a direct line from the other; as between John Stiles (the *propositus* in the table of consanguinity) and his father, grandfather, great grandfather, and so upwards in the direct ascending line; or between John Stiles and his son, grandson, great grandson, and so downwards in the direct descending line. Every generation, in this direct lineal consanguinity, constitutes a different degree, reckoning either upwards or downwards: the father of John Stiles is related to him in the first degree, and so likewise is his son; his grandfire and grandson, in the second; his great grandfire and great-grandson in the third. This is the only natural way of reckoning

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Consanguinity.

Consanguinity. reckoning the degrees in the direct line; and therefore universally obtains, as well in the civil and canon, as in the common law.

The doctrine of lineal consanguinity is sufficiently plain and obvious; but it is, at the first view, astonishing to consider the number of lineal ancestors which every man has, within no very great number of degrees: and so many different bloods is a man said to contain in his veins, as he hath lineal ancestors. Of these he hath two in the first descending degree; his own parents: he hath four in the second; the parents of his father, and the parents of his mother: he hath eight in the third, the parents of his two grandfathers, and of his two grandmothers: and, by the same rule of progression, he hath 128 in the seventh; 1024 in the tenth; and at the 20th degree, or the distance of 20 generations, every man hath above a million of ancestors, as common arithmetic will demonstrate (A). This lineal consanguinity, we may observe, falls strictly within the definition of *vinculum personarum ab eodem stipite descendit*; since lineal relations are such as descend one from the other, and both of course from the same common ancestor.

Collateral kindred answers to the same description: collateral relations agreeing with the lineal in this, that they descend from the same stock or ancestor; but differing in this, that they do not descend the one from the other. Collateral kinsmen, then, are such as lineally spring from one and the same ancestor, who is the *stirps*, or "root," the *stipes*, "trunk," or common stock, from whence these relations are branched out. As if John Stiles hath two sons, who have each a nu-

merous issue: both these issues are lineally descended from John Stiles as their common ancestor; and they are collateral kinsmen to each other, because they are all descended from this common ancestor, and all have a portion of his blood in their veins, which denominates them *consanguineous*.

We must be careful to remember, that the very being of collateral consanguinity consists in this descent from one and the same common ancestor. Thus Titius and his brother are related; why? because both are derived from one father: Titius and his first cousin are related; why? because both descend from the same grandfather; and his second cousin's claim to consanguinity is this, that they are both derived from one and the same great-grandfather. In short, as many ancestors as a man has, so many common stocks he has from which collateral kinsmen may be derived. And as we are taught by holy writ, that there is one couple of common ancestors belonging to us all, from whom the whole race of mankind is descended, the obvious and undeniable consequence is, that all men are in some degree related to one another. For, indeed, if we only suppose each couple of our ancestors to have left, one with another, two children; and each of those children to have left, on an average, two more (and without such a supposition the human species must be daily diminishing); we shall find that all of us have now subsisting near 270 millions of kindred in the 15th degree, at the same distance from the several common ancestors as we ourselves are; besides those that are one or two degrees nearer to or farther from the common stock, who may amount to as many more.

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(A) This will seem surprising to those who are unacquainted with the increasing power of progressive numbers; but is palpably evident from the following table of a geometrical progression, in which the first term is 2, and the denominator also 2: or, to speak more intelligibly, it is evident, for that each of us has two ancestors in the first degree, the number of whom is doubled at every remove; because each of our ancestors has also two immediate ancestors of his own.

1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256
9	512
10	1024
11	2048
12	4096
13	8192
14	16384
15	32768
16	65536
17	131072
18	262144
19	524288
20	1048576

A shorter way of finding the number of ancestors at any even degree, is by squaring the number of ancestors at half that number of degrees. Thus 16, the number of ancestors at 4 degrees, is the square of 4, the number of ancestors at two; 256 is the square of 16; 65536 of 256; and the number of ancestors at 40 degrees would be the square of 1,048,576, or upwards of a million of millions.

Confanguinity. more (s). And if this calculation should appear incompatible with the number of inhabitants on the earth, it is because, by intermarriages among the several descendants from the same ancestor, a hundred or a thousand modes of consanguinity may be consolidated in one person; or he may be related to us a hundred or a thousand different ways.

The method of computing these degrees in the canon law, which we have adopted, is as follows. We begin at the common ancestor, and reckon downwards; and in whatsoever degree the two persons, or the most remote of them, is distant from the common ancestor, that is the degree in which they are related to each other. Thus, Titius and his brother are related in the first degree; for from the father to each of them is counted only one: Titius and his nephew are related in the second degree; for the nephew is two degrees removed from the common ancestor, viz. his own grandfather, the father of Titius: or (to give a more illustrious instance from the English annals) King Henry VII. who slew Richard III. in the battle of Bosworth, was related to that prince in the fifth degree. Let the *propositus*, therefore, in the table of consanguinity, represent King Richard III. and the class marked E, King Henry VII. Now their common stock

or ancestor was King Edward III. the *abavus* in the same table: from him to Edmund duke of York, the *proavus* is one degree; to Richard earl of Cambridge, the *avus*, two; to Richard duke of York, the *pater*, three; to King Richard III. the *propositus*, four; and from King Edward III. to John of Gant (A) is one degree; to John earl of Somerset (B) two; to John duke of Somerset (C) three; to Margaret Countess of Richmond (D) four; to King Henry VII. (E) five. Which last-mentioned prince, being the farthest removed from the common stock, gives the denomination to the degree of kindred in the canon and municipal law. Though according to the computation of the civilians (who count upwards from either of the persons related, to the common stock, and then downwards again to the other; reckoning a degree for each person both ascending and descending) these two princes were related in the ninth degree: for from King Richard III. to Richard duke of York is one degree; to Richard earl of Cambridge two; to Edmund duke of York three; to King Edward III. the common ancestor, four; to John of Gant five; to John earl of Somerset six; to John duke of Somerset seven; to Margaret countess of Richmond eight; to King Henry VII. nine. See the Table of Consanguinity

(B) This will swell more considerably than the former calculation: for here, though the first term is but 1, the denominator is 4; that is, there is *one* kinsman (a brother) in the first degree, who makes, together with the *propositus*, the two descendants from the first couple of ancestors; and in every other degree, the number of kindred must be the *quadruple* of those in the degree which immediately precedes it. For since each couple of ancestors has two descendants who increase in a duplicate ratio, it will follow, that the ratio in which all the descendants increase downwards, must be double to that in which the ancestors increase upwards: but we have seen, that the ancestors increase in a duplicate ratio: therefore the descendants must increase in a double duplicate; that is, in a quadruple ratio.

Collateral Degrees. Number of Kindred.

1	1
2	4
3	16
4	64
5	256
6	1024
7	4096
8	16384
9	65536
10	262144
11	1048576
12	4194304
13	16777216
14	67108864
15	268435456
16	1073741824
17	4294967296
18	17179869184
19	68719476736
20	274877906944

This calculation may also be formed by a more compendious process, viz. by squaring the couples, or half the number of ancestors, at any given degree; which will furnish us with the number of kindred we have in the same degree, at equal distance with ourselves from the common stock, besides those at unequal distances. Thus, in the tenth lineal degree, the number of ancestors is 1024; its half, or the couples, amount to 512; the number of kindred in the tenth collateral degree amounts therefore to 262144, or the square of 512. And if we will be at the trouble to recollect the state of the several families within our own knowledge, and observe how far they agree with this account; that is, whether, on an average, every man has not one brother or sister, four first-cousins, sixteen second-cousins, and so on; we shall find, that the present calculation is very far from being overcharged.

Confanguini-
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Conscience.

Confanguinity (Plate CXLVI.), wherein all the degrees of collateral kindred to the *propositus* are computed, as far as the tenth of the civilians and the seventh of the canonists inclusive; the former being distinguished by the numeral letters, the latter by the common ciphers.

CONSANGUINITY and *Affinity* (degrees of), forbidden in marriage. See MARRIAGE; and LAW, Part III. N° clx. 4.

CONSANGUINITY and *Affinity*, an objection against a judge. See LAW, Part III. N° clvi. 12. Against a witness, *ibid.* clxxxiv. 12.

CONSCIENCE, a secret testimony of the soul, whereby it gives its approbation to things that are naturally good, and condemns those that are evil. See *MORAL Philosophy*.

A man of integrity will never listen to any reason, or give way to any measure, or be misled by any inducement, against conscience.—The inhabitants of a great town offered Marshal de Turenne 100,000 crowns, upon condition he would take another road, and not march his troops their way. He answered them, “As your town is not in the road I intend to march, I cannot accept the money you offer me.”—The Earl of Derby, in the reign of Edward III. making a descent in Guienne, carried by storm the town of Bergerac, and gave it up to be plundered. A Welch knight happened by chance to light upon the receiver’s office. He found there such a quantity of money that he thought himself obliged to acquaint his general with it, imagining that so great a booty naturally belonged to him. But he was agreeably surprised when the earl told him, with a pleasant countenance, that he wished him joy of his good fortune: and that he did not make the keeping of his word to depend upon the great or little value of the thing he had promised.—In the siege of Falisci by Camillus general of the Romans, the schoolmaster of the town, who had the children of the senators under his care, led them abroad under the pretext of recreation, and carried them to the Roman camp, saying to Camillus, that by this artifice he had delivered Falisci into his hands. Camillus abhorring this treachery, observed, “That there were laws for war as well as for peace; and that the Romans were taught to make war with integrity not less than with courage.” He ordered the schoolmaster to be stripped, his hands to be bound behind his back, and to be delivered to the boys to be lashed back into the town. The Falerians, formerly obstinate in resistance, struck with an act of justice so illustrious, delivered themselves up to the Romans; convinced that they would be far better to have the Romans for their allies than their enemies.

It is a saying, That no man ever offended his own conscience, but first or last it was revenged upon him. The power of conscience indeed has been remarked in all ages, and the examples of it upon record are innumerable. The following is related by Mr Fordyce, in his *Dialogues on Education**, as a real occurrence which happened in a neighbouring state not many years ago. A jeweller, a man of good character and considerable wealth, having occasion in the way of his business to travel at some distance from the place of his abode, took along with him a servant, in order to take care of his portmanteau. He had with him some

of his best jewels, and a large sum of money, to which his servant was likewise privy. The master having occasion to dismount on the road, the servant watching his opportunity, took a pistol from his master’s saddle and shot him dead on the spot; then rifled him of his jewels and money, and hanging a large stone to his neck, he threw him into the nearest canal. With this booty he made off to a distant part of the country, where he had reason to believe that neither he nor his master were known. There he began to trade in a very low way at first, that his obscurity might screen him from observation, and in the course of a good many years seemed to rise, by the natural progress of business, into wealth and consideration; so that his good fortune appeared at once the effect and reward of industry and virtue. Of these he counterfeited the appearance so well, that he grew into great credit, married into a good family, and by laying out his hidden stores discreetly, as he saw occasion, and joining to all an universal affability, he was admitted to a share of the government of the town, and rose from one post to another, till at length he was chosen chief magistrate. In this office he maintained a fair character, and continued to fill it with no small applause, both as a governor and a judge; till one day as he sat on the bench with some of his brethren, a criminal was brought before him who was accused of murdering his master. The evidence came out full, the jury brought in their verdict that the prisoner was guilty, and the whole assembly waited the sentence of the president of the court (which he happened to be that day) with great suspense. Mean while he appeared to be in unusual disorder and agitation of mind, and his colour changed often; at length he arose from his seat, and coming down from the bench, placed himself just by the unfortunate man at the bar. “You see before you (said he, addressing himself to those who had sat on the bench with him), a striking instance of the just rewards of heaven, which this day, after 30 years concealment, presents to you a greater criminal than the man just now found guilty.” Then he made an ample confession of his guilt, and of all its aggravations. “Nor can I feel (continued he) any relief from the agonies of an awakened conscience, but by requiring that justice be forthwith done against me in the most public and solemn manner.” We may easily suppose the amazement of all the assembly, and especially of his fellow-judges. However, they proceeded, upon this confession, to pass sentence upon him, and he died with all the symptoms of a penitent mind.

Courts of CONSCIENCE, are courts for recovery of small debts, constituted by act of parliament in London, Westminster, &c. and other populous and trading districts.

CONSCIOUSNESS. Metaphysicians, in lieu of the word *conscience*, which seems appropriated to theological or moral matters, ordinarily use that of *consciousness*; whereby they mean an inner sentiment of a thing, whereof one may have a clear and distinct notion. In this sense they say that we do not know our own soul, nor are assured of the existence of our own thoughts, otherwise than by self-consciousness. See METAPHYSICS.

CONSCRIPT, in Roman antiquity, an appellation given to the senators of Rome, who were called *con-*

Conscience
Conscript.

* Vol. II.
p. 401.

Consecra-
tion,
Consent.

script fathers, on account of their names being all entered in one register.

CONSECRATION, the act of devoting any thing to the service and worship of God. The Mosaic law ordained, that all the first-born, both of man and beast, should be sanctified or consecrated to God. We find also, that Joshua consecrated the Gibeonites, as Solomon and David did the Nethinims, to the service of the temple; and that the Hebrews sometimes consecrated their fields and cattle to the Lord, after which they were no longer in their power.

Among the ancient Christians, the consecration of churches was performed with a great deal of pious solemnity. In what manner it was done for the three first ages, is uncertain; the authentic accounts reaching no higher than the fourth, when, in the peaceable reign of Constantine, churches were every where built, and dedicated with great solemnity. Some think the consecration consisted in setting up the sign of the cross, or in placing a communion table in the church; and others, that no more was done than preaching a panegyric sermon in commemoration of the founder, and that then they proceeded to prayers, one of which was composed on purpose for the church to be consecrated. The Romanists have a great deal of pious foppery in the ceremonies of consecration; which they bestow on almost every thing, as bells, candles, books, water, oil, ashes, palms, swords, banners, pictures, crosses, agnus dei's, roses, childrens clouts, &c.

In England, churches have been always consecrated with particular ceremonies, the form of which was left to the discretion of the bishop. That observed by bishop Laud, in consecrating St Catherine Creed church, in London, gave great offence.

CONSECRATION is particularly used for the benediction of the elements in the eucharist.

CONSECRATION, among medalists, is the ceremony of the apotheosis of an emperor, or his translation into heaven and reception among the gods. On medals the consecration is thus represented: on one side is the emperor's head, crowned with laurel, sometimes veiled; and the inscription gives him the title of *divus*: on the reverse is a temple, a bustum, an altar, or an eagle taking its flight towards heaven, either from off the altar, or from a cippus: at other times the emperor is seen in the air, borne up by the eagle; the inscription always, *consecratio*. These are the usual symbols: yet on the reverse of that of Antoninus is the Antonine column. In the apotheosis of empresses, instead of an eagle there is a peacock. As to the honours rendered these princes after death, they were explained by the words *consecratio*, *pater*, *divus*, and *deus*. Sometimes around the temple or altar are put, *memoria felix*, or *memoria aeterna*: for princesses, *aeternitas*, and *fidelibus recepta*: on the side of the head, *dea*, or *Θεα*.

CONSENT, in a general sense, denotes much the same with **ASSENT**.

CONSENT of Parts, in the animal economy, an agreement or sympathy, whereby when one part is immediately affected, another at a distance becomes affected in the same manner.

This mutual accord or consent is supposed to be effected by the commerce of the nerves, and their artful distribution and ramification throughout the body. The effect is so sensible as even to come under the

physician's cognizance: thus, the stone in the bladder, by vellicating the fibres there, will pain and draw them so much into spasms, as to affect the coats of the bowels, in the same manner, by the intermediation of nervous threads, and make a colic there; and also extend their twitches sometimes as far as the stomach, and occasion grievous vomitings: the remedy, therefore, in such cases, is to regard the part originally affected, how remote and grievous soever may be the consequences and symptoms in other places.

The fifth conjugation of nerves branched to the parts of the eye, the ear, those of the mouth, cheeks, præcordia, and parts adjacent, &c. is supposed by naturalists to be the instrument of that particular and extraordinary consent between those parts. Hence it is, that a savoury thing seen or smelled excites the appetite, and affects the glands and parts of the mouth; that a shameful thing seen or heard affects the cheeks with blushes: on the contrary, if it pleases, it affects the præcordia, and excites the muscles of the mouth and face to laughter; if it grieve, it affects the glands of the eyes, so as to occasion tears, and the muscles of the face, putting them into an aspect of crying. Dr Willis, quoted by Mr Derham, imputes the pleasure of kissing, and its effects, to this pair of nerves; which being branched both to the lips and the genital parts, when the former are affected an irritation is occasioned in the latter. See **SYMPATHY**.

CONSENTES, the name which the Romans gave to the 12 superior gods, the *Dii majorum gentium*. The word signifies as much as *consentientes*; that is, who consented to the deliberations of Jupiter's council. They were twelve in number, whose name Ennius has briefly expressed in these lines,

Juno, Vesta, Minerva, Ceres, Diana, Venus, Mars, Mercurius, Jovi, Neptunus, Vulcanus, Apollo.

CONSEQUENCE, in logic, the conclusion, or what results from reason or argument. See **CONCLUSION**.

The consequence is that other proposition in which the extremes or premises of a syllogism are joined, or separated; and is gained from what was asserted in the premises.

This word, in a more restrained sense, is used for the relation or connection between two propositions, whereof one is inferred from the other.

CONSEQUENT, something deduced or gathered from a former argumentation. But, in a more precise sense, it is used for the proposition which contains the conclusion, considered in itself, without any regard to the antecedent: in which sense the consequent may be true, though the consequence be false. See the preceding article.

CONSERVATOR, an officer ordained for the security and preservation of the privileges of some cities and communities, having a commission to judge of and determine the differences among them.

In most catholic universities there are two conservators; the conservator of royal privileges, or those granted by kings; and the conservator of apostolical privileges, or those granted by the pope. The first takes cognizance of personal and mixed causes between the regents, students, &c. and the latter of spiritual matters between ecclesiastics.

Anciently

Consentes
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Conserva-
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Conserva-
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Consign-
ment.

Anciently there were appointed conservators of treaties of peace between princes; which conservators became judges of the infractions made on a treaty, and were charged with procuring satisfaction to be made. These were usually the feudatories of the several powers. In lieu of conservators, princes now have recourse to other indifferent princes to guarantee their treaties.

CONSERVATOR of Scots Privileges at Campvere, is an officer belonging to the royal boroughs of Scotland, who takes care of the mercantile affairs of Scotland, agreeable to the staple contract between them and the States-General.

CONSERVATOR of the Peace, in the ancient English customs, was a person who had an especial charge, by virtue of his office, to see the king's peace kept. Till the erection of justices of the peace by king Edward III. there were several persons who by common law were interested in keeping the same: some having that charge as incident to other offices; and others simply, or of itself, called *custodes*, or *conservators of the peace*. The chamberlain of Chester is still a conservator in that county; and petty constables are, by the common law, conservators, &c. in the first sense, within their own jurisdiction: so are also the coroner and the sheriff within their own county. The king is the principal conservator of the peace within all his dominions: the lord chancellor, lord treasurer, lord high steward, lord marshal, lord high constable, all the justices of the court of king's bench, by their office, and the master of the rolls, by prescription, are general conservators of the peace through the whole kingdom, and may commit breakers of the peace, and bind them in recognisances to keep it.

CONSERVATOR of the Truce, and Safe Conducts, was an officer appointed in every sea-port, under the king's letters patent. His charge was to enquire of all offences committed against the king's truce, and safe conducts upon the main sea, out of the franchises of the cinque-ports, as the admirals were wont to do, and such other things as are declared *anno* 3 Hen. V. cap. 6.

CONSERVATORIOS, are musical schools established for the instruction of children in the profession of music. There are four of these at Venice, designed for the education of girls, and three at Naples, for the education of boys. It has been suggested that the operation of castration was performed in the conservatorios; but the practice is absolutely prohibited; and the young castrati are brought from Lucia in Puglia: but before the operation is performed, their voices are tried in a conservatorio. The scholars of the Venetian conservatorios have been chiefly celebrated for taste and neatness of execution; and those of Naples have had the reputation of being the first *contrapuntists*, or composers, in Europe.

CONSERVATORY, a term sometimes used for a green-house or ice-house.

CONSERVE, in pharmacy, a form of medicine contrived to preserve the flowers, herbs, roots, or fruits of several simples, as near as possible, to what they are when fresh gathered. See PHARMACY.

CONSIGNMENT, in law, the depositing any sum of money, bills, papers, or commodities, in good hands; either by appointment of a court of justice, in

order to be delivered to the persons to whom they are adjudged; or voluntarily, in order to their being remitted to the persons they belong to, or sent to the places they are designed for.

Consign-
ment
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Consistory.

CONSIGNMENT of Goods, in commerce, is the delivering or making them over to another: thus, goods are said to be consigned to a factor, when they are sent to him to be sold, &c.; or when a factor sends back goods to his principal, they are said to be consigned to him.

CONSISTENCE, in physics, that state of a body wherein its component particles are so connected or entangled among themselves, as not to separate or recede from each other. It differs from continuity in this, that it implies a regard to motion or rest, which continuity does not, it being sufficient to denominate a thing continuous that its parts are contiguous to each other.

CONSISTENTES, in church-history, a kind of penitents who were allowed to assist at prayers, but who could not be admitted to receive the sacrament.

CONSISTORY (*Consistorium*), signifies as much as *prætorium*, a tribunal: it is commonly used for a council-house of ecclesiastical persons, or place of justice in the spiritual court; a session or assembly of prelates. And every archbishop and bishop of every diocese hath a consistory court held before his chancellor or commissary in his cathedral church, or other convenient place of his diocese, for ecclesiastical causes. The bishop's chancellor is the judge of this court, supposed to be skilled in the civil and canon law; and in places of the diocese far remote from the bishop's consistory, the bishop appoints a commissary to judge in all causes within a certain district, and a register to enter his decrees, &c.

CONSISTORY, at Rome, denotes the college of cardinals, or the pope's senate and council, before whom judiciary causes are pleaded. Du-Cange derives the word from *consistorium*; i. e. *locus ubi consistitur*; used chiefly for a vestibule, gallery, or anti-chamber, where the courtiers wait for admission; and called *à consistente multitudine*.

The consistory is the first court, or tribunal of Rome: it never meets but when the pope pleases to convoke it: the pope presides in it in person, mounted on a magnificent throne, and habited in his *pontificalia*; on the right are the cardinal-bishops and priests, and on the left the cardinal-deacons. The place where it is held, is a large hall in the apostolical palace, where princes and ambassadors of kings are received. The other prelates, prothonotaries, auditors of the rota, and other officers, are seated on the steps of the throne: the courtiers sit on the ground; ambassadors on the right, and consistorial and fiscal advocates behind the cardinals.

Besides the public consistory, there is also a private one, held in a retired chamber, called the *chamber of papegay*; the pope's throne here being only raised two steps high. Nobody is here admitted but the cardinals, whose opinions are collected, and called *sentences*. Here are first proposed and passed all bulls for bishopricks, abbeys, &c. Hence bishopricks and abbeys are said to be consistorial benefices; in regard they must be proposed in the consistory, the annates be paid

to

Consistory to the pope, and his bulls taken. Anciently they were elective; but by the concordat, which abolishes elections, they are appointed to be collated by the pope alone, on the nomination of the prince.

Conspiracy.

CONSISTORY was also the name of a court under Constantine, where he sat in person, and heard causes: the members of this court were called *comites*.

CONSISTORY is also used among the reformed, for a council or assembly of ministers and elders, to regulate their affairs, discipline, &c.

CONSISTORY, or court Christian in the English laws, is a council of ecclesiastical persons, or the place of justice in an ecclesiastical or spiritual court. Every archbishop and bishop has a consistory-court, held before his chancellor or commissary, either in his cathedral, in some chapel, aisle, or portico, belonging thereto; or in some other convenient place of his diocese, for ecclesiastical causes. The spiritual court was anciently, in the time of the Saxons, joined with the county or hundred court; and the original of the consistory court, as divided from those courts, is found in a law of the conqueror, quoted by lord Coke. From this court there lies an appeal to the archbishop of each province respectively.

CONSOLATION, one of the places in rhetoric, wherein the orator endeavours to abate and moderate the grief or concern of another.

CONSOLE, in architecture, an ornament cut upon the key of an arch, which has a projecture, and on occasion serves to support little corniches, figures, busts, and vases.

CONSOLIDATION, in law, the combining and uniting two benefices into one. The term is borrowed from the civil law; where it properly signifies an union of the possession, or occupation, with the property. Thus, if a man have by legacy *usum fructum fundi*, and afterwards buy the property, or fee-simple, of the heir; this is called a *consolidation*.

CONSOLIDATION, in medicine, the action of uniting broken bones, or the lips of wounds, by means of *consolidating remedies*, as they are called; which cleansing with a moderate heat and force, taking corruption out of the wounds, and preserving the temperature of the parts, cause the nourishment to be fitly applied to the part affected.

Among the many instances of the consolidating power of blood and raw flesh, we have a very remarkable one in Bartholine's Medical Observations. A man being condemned to have his nose cut off by the hand of the common executioner, the friends, who were to be present, provided a new loaf of warm bread, which was cut in the middle, and the nose received in it as it fell from the face: the nose was after this nicely placed on the face again; and, being sewed on, the whole in time consolidated, and left no other marks of the ignominy than the scar round the whole nose, and the traces of the stitches.

CONSONANCE, in music. See **INTERVAL**.

CONSONANT, a letter that cannot be sounded without some single or double vowel before or after it; as *b, c, d*, &c.

CONSORT, *Queen Consort*. See **QUEEN**.

CONSPIRACY, in law, signifies an agreement between two or more, falsely to indict, or procure to be indicted, an innocent person, of felony.

CONSPIRATORS are, by statute, defined to be such as bind themselves by oath, covenant, or other alliance, to assist one another falsely and maliciously to indict persons, or falsely to maintain pleas.

Conspirators, Constable.

Conspirators in treason, are those that plot against the king and the government.

CONSTABLE, according to some, is a Saxon word, compounded of *coning*, "king," and *staple* which signifies the "stay or support of the king." But as we borrowed the name as well as the office of *Constable* from the French, Sir William Blackstone is rather inclined to deduce it, with Sir Henry Spelman and Dr Cowel, from that language; wherein it is plainly derived from the Latin *comes stabuli*, an officer well known in the empire; so called, because, like the great constable of France, as well as the lord high constable of England, he was to regulate all matters of chivalry, tilts, tournaments, and feats of arms, which were performed on horseback.—The

Lord High Constable of England is the seventh great officer of the crown; and he, with the earl marshal of England, were formerly judges of the court of chivalry, called in king Henry IV.'s, time *Curia Militaris*, and now the court of honour. It is the fountain of the martial law, and anciently was held in the king's hall. The power of the lord high constable was formerly so great, and of which so improper a use was made, that so early as the 13th of king Richard II. a statute passed for regulating and abridging the same, together with the power of the earl marshal of England; and by this statute, no plea could be tried by them or their courts, that could be tried by the common law of the realm. The office of constable existed before the conquest. After the conquest, the office went with inheritance, and by the tenure of the manors of Harlefield, Newnham, and Whitenhurst, in Gloucestershire, by grand serjeanty in the family of the Bohuns earl of Hereford and Essex; and afterwards in line of Sessford as heirs-general to them; but in 1521, this great office became forfeited to the king in the person of Edward Stafford duke of Buckingham, who was that year attainted for high treason; and in consideration of its extensive power, dignity, and large authority, both in time of war and peace, it has never been granted to any person, otherwise than *hac vice*, and that to attend at a coronation, or trial by combat. In France, the same office was also suppressed about a century after by an edict of Louis XIII; though it has been exercised, in the command of the **MARSHALS**, by the first officer in the army.

Lord high constable of Scotland was an office of great antiquity and dignity. The first upon record is Hugo de Morvelle in the reign of David I. He had two grand prerogatives, viz. First, the keeping of the king's sword, which the king, at his promotion, when he swears fealty, delivers to him naked. Hence the badge of the constable is a naked sword.—Second, The absolute and unlimited command of the king's armies while in the field, in the absence of the king; but this command does not extend to castles and garrisons. He was likewise judge of all crimes committed within two leagues of the king's house, which precinct was called the *Chalmer of Peace*. Though his jurisdiction came at last to be exercised only as to crimes during the time of parliament, which some extended likewise

to

Constable. to all general conventions. This office was conferred heritably upon the noble family of Errol, by King Robert Bruce; and with them it still remains, being expressly reserved by the treaty of union.

Inferior CONSTABLES. From the great office of high constable is derived that inferior order, since called the *constables of hundreds and franchises*; these were first ordained in the 13th year of Edward I. by the statute of Winchester; which, for the conservation of the peace, and view of armour, appointed that two constables should be chosen in every hundred and franchise. These are what we now call *constabularii capitales*, or *high constables*; because continuance of time, and increase of people, &c. have occasioned others of like nature, but inferior authority, in every town, called *petty constables*, or *sub-constabularii*, first instituted about the reign of Edward III.

The former, or modern *high constables*, are appointed at the court-leets of the franchise or hundred over which they preside; or, in default of that, by the justices at their quarter-sessions; and are removeable by the same authority that appoints them. The *petty constables* have two offices united in them, the one ancient, and the other modern. Their ancient office is that of head-borough, tithing-man, or borsholder; who are as ancient as the time of King Alfred: their more modern office is that of constable merely; which was appointed so lately as the reign of Edward III. in order to assist the high-constable. And in general the ancient head-boroughs, tithing-men, and borsholders, were made use of to serve as petty constables; though not so generally, but that in many places they still continue distinct officers from the constables. They are all chosen by the jury at the court-leet; or if no court-leet be held, are appointed by two justices of the peace.

The general duty of all constables, both high and petty, as well as of the other officers, is to keep the king's peace in their several districts; and to that purpose they are armed with very large powers of arresting and imprisoning, of breaking open houses, and the like: of the extent of which powers, considering what manner of men are for the most part put upon these offices, it is perhaps very well that they are generally kept in ignorance. One of their principal duties arising from the statute of Winchester, which appoints them, is to keep watch and ward in their respective jurisdictions. Ward, guard, or *custodia*, is chiefly intended of the day-time, in order to apprehend rioters, and robbers on the highways; the manner of doing which is left to the discretion of the justices of the peace and the constable: the hundred being, however, liable for all the robberies committed therein by day-light, for having kept negligent guard. Watch is properly applicable to the night only (being called among the Saxons *wach't* or *wahtu*); and it begins when ward ends, and ends when that begins: for, by the statute of Winchester, in walled towns the gates shall be closed from sun-setting to sun-rising; and watch shall be kept in every borough and town, especially in the summer season, to apprehend all rogues, vagabonds, and night-walkers, and make them give an account of themselves. The constable may appoint watchmen at his discretion, regulated by the custom of the place; and these, being his deputies, have, for the time being, the authority of their principal.

There are also constables denominated from particular places, as constable of the Tower, of Dover castle, of Windsor castle, of the castle of Caernarvon, and many other of the castles of Wales; whose office is the same with that of the castellani, or governors of castles.

CONSTABLES of London. The city of London is divided into 26 wards, and the wards into precincts, in each whereof is a constable. They are nominated by the inhabitants of each precinct on St Thomas's day, and confirmed, or otherwise, at the court of wardmote. After confirmation, they are sworn into their offices at a court of aldermen, on the next Monday after Twelfth day. Such as are chosen into the office, are obliged to place the king's arms, and the arms of the city, over their doors; and if they reside in alleys, at the ends of such alleys toward the streets, to signify that a constable lives there, and that they may be the more easily found when wanted.

CONSTABLES to Justices of the Peace, in Scotland, are the proper officers for executing their orders. They have powers to suppress tumults, and to apprehend delinquents and those who can give no good account of themselves, and carry them to the next justice.

CONSTANCE, a strong town of Germany, in the circle of Suabia, with a bishop's see, whose bishop is a prince of the empire. It has a handsome bridge, and several fine structures, as well sacred as profane. It carries on a great trade, and is well fortified; and though it pretends to be an imperial town, the Austrians keep a garrison here. It is famous for a council held here in 1514, when there were three popes; but they were all deposed, and Martin V. was elected in their room. The council caused Jerom of Prague to be burnt, though the emperor Sigismund had given him a safe conduct; in pursuance of this maxim, "that no faith is to be kept with heretics." They likewise condemned the doctrine of Wickliff, and ordered his bones to be burned 40 years after he was dead. However, the inhabitants now are Protestants. It is seated on a lake of the same name. E. Long. 9. 12. N. Lat. 47. 35.

CONSTANCE, a great lake of Germany, between Suabia and Swisserland. It is 30 miles in length, and 8 in breadth. It is crossed by the river Rhine; and there are several towns on its banks.

CONSTANCY, in a general sense, denotes immutability, or invariableness.—In ethics, or when applied to the human mind, the term implies resolution or steadiness, particularly under sufferings and the trials of adversity.

It was the saying of a heathen philosopher, That there cannot be imagined upon earth a spectacle more worthy the regard of the Creator intent on his works, than a brave man superior to his sufferings. Nothing indeed can be more noble or honourable than to have courage enough to execute the commands of reason and conscience; to maintain the dignity of our nature, and the station assigned us; and to be proof against poverty, pain, and death itself, so far as not to do any thing that is scandalous or sinful to avoid them. To be thus, is to be great above title and fortune. This argues the soul of an heavenly extraction, and is worthy the offspring of the Deity.

Of this virtue the following example, related in English

Constable
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Constancy.

Constancy. English history, is here selected, as superior perhaps, all circumstances considered, to any other upon record.

Sir William Askew of Kelfay, in Lincolnshire, had several daughters. His second, named *Anne*, had received a genteel education; which, with an agreeable figure and good understanding, rendered her a very proper person to be at the head of a family. Her father, regardless of his daughter's inclination and happiness, obliged her to marry a gentleman who had nothing to recommend him but his fortune, and who was a most bigoted Papist. No sooner was he convinced of his wife's regard for the doctrines of the reformation from popery, than, by the instigation of the priests, he violently drove her from his house, though she had born him two children, and her conduct was unexceptionable. Abandoned by her husband, she came up to London, in order to procure a divorce, and to make herself known to that part of the court who either professed or were favourers of Protestantism: but as Henry VIII. with consent of parliament, had just enacted the law of the six articles, commonly called the *bloody statute*, she was cruelly betrayed by her own husband; and, upon his information, taken into custody, and examined concerning her faith. The act above-mentioned denounced death against all those who should deny the doctrine of *transubstantiation*; or, that the bread and wine made use of in the sacrament was not converted after consecration into the *real* body and blood of Christ; or, maintain the necessity of receiving the sacrament in both kinds; or affirm, that it was lawful for priests to marry; that the vows of celibacy might be broken; that private masses were of no avail; and that auricular confession to a priest was not necessary to salvation. Upon these articles she was examined by the inquisitor, a priest, the lord-mayor of London, and the bishop's chancellor; and to all their queries gave proper and pertinent answers; but not being such as they approved, she was sent back to prison, where she remained eleven days to ruminate alone on her alarming situation, and was denied the small consolation of a friendly visit. The king's council being at Greenwich, she was once more examined by chancellor Wriothesley, Gardiner bishop of Winchester, Dr Cox, and Dr Robinson; but not being able to convince her of supposed errors, she was sent to the Tower. Mr Strype, from an authentic paper, gives us the following short account of her examination, which may not, perhaps, be unentertaining or useless to the reader: "Sir Martin Bowes (lord mayor) sitting with the council, as most meet for his wisdom, and seeing her stand upon life and death, I pray you, quoth he, my lords, give me leave to talk to this woman? Leave was granted. *Lord Mayor.* Thou foolish woman, sayest thou that the priest cannot make the holy body of Christ? *A. Askew.* I say so, my lord: for I have read that God made man; but that man made God I never read; nor I suppose ever shall read it. *Lord Mayor.* No! Thou foolish woman, after the words of consecration, is it not the Lord's body? *A. Askew.* No: it is but consecrated bread, or sacramental bread. *Lord Mayor.* What if a mouse eat it after consecration; what shall become of this mouse? what sayest thou, thou foolish woman? *A. Askew.* What shall become of her, say you, my lord? *Lord Mayor.* I say, that the mouse is damned.

A. Askew. Alack, poor mouse!" Perceiving that some could not keep in their laughing, the council proceeded to the butchery and slaughter that they intended before they came there.—It was strongly suspected that Mrs Askew was favoured by some ladies of high rank; and that she carried on a religious correspondence with the queen. So that the chancellor Wriothesley, hoping that he might discover something that would afford matter of impeachment against that princess, the earl of Hertford, or his countess, who all favoured reformation, ordered her to be put to the rack: but her fortitude in suffering, and her resolution not to betray her friends, was proof against that diabolical invention. Not a groan, not a word, could be extorted from her. The chancellor, provoked with what he called her obstinacy, augmented her tortures with his own hands, and with unheard of violence: but her courage and constancy were invincible; and these barbarians gained nothing by their cruelties but everlasting disgrace and infamy. As soon as she was taken from the rack, she fainted away; but being recovered, she was condemned to the flames. Her bones were dislocated in such a manner, that they were forced to carry her in a chair to the place of execution. While she was at the stake, letters were brought her from the lord chancellor, offering her the king's pardon if she would recant. But she refused to look at them; telling the messenger, that "she came not thither to deny her Lord and Master." The same letters were also tendered to three other persons condemned to the same fate; and who, animated by her example, refused to accept them. Whereupon the lord-mayor commanded the fire to be kindled; and with savage ignorance cried out, *Fiat justitia*, "Let justice take its course." The faggots being lighted, she commended her soul, with the utmost composure, into the hands of her Maker; and, like the great founder of the religion she professed, expired, *praying for her murderers*, July 16. 1546, about the 25th year of her age.

CONSTANTIA, a district at the Cape of Good Hope, consisting of two farms, which produce the well-known wine so much prized in Europe, and known by the name of *Cape* or *Constantia* wine. This place is situated at the distance of a mile and a half from Alphen, in a bending formed by and nearly under the ridge of hills, which comes from Meusemountain, and just where it strikes off towards Houtbay. One of these farms is called *Little Constantia*. Here the white Constantia wine is made. The other produces the red. According to M. de la Cail's account, not more than 60 figgars of red, and 90 of the white Constantia wine are made, each figgar being reckoned at 600 French pints, or about 150 Swedish cans; so that the whole produce amounts to 22,500 cans. As the company are used to keep one third of this for themselves, the remainder is always bespoke by the Europeans long before it is made. At the Cape this wine is seldom seen at table, partly because it is dear, and partly because it is the produce of the country. The red Constantia wine sells for about 60 rixdollars the half awin; but the white is usually to be purchased at a more reasonable rate. The genuine Constantia wine is undeniably a very racy and delicate desert wine, and has something peculiarly agreeable in the flavour of it. That its superiority,

Constantia
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Constantine.

periority, however, is not owing to any thing peculiar in the manner of preparing it, seems extremely probable; for then, without doubt, a great deal more of it would be made. In fact, Dr Sparmann informs us, that the genuine wine can only be produced by certain particular soils. The districts that lie next to these yield merely the common Cape wine, notwithstanding that they have been planted with vine-stocks taken from this, as well as with some brought from the banks of the Rhine, whence it is supposed that the true Constantia sort originally comes; nay, even tho' all the vineyards about Constantia seem to have the same soil. We have instances at the Cape, as well as in Europe, that good grapes sometimes produce a bad wine; while, on the other hand, bad grapes will yield a good sort of wine: therefore, towards making wine of a certain quality, besides finer materials, there must be certain conditions and circumstances, which, by a diligent and rational investigation, might probably be explored to the great benefit of mankind.

Such as are apprised in what quantities Constantia wine is consumed in Europe, will perhaps think the above calculation of the produce too limited. This, however, Dr Sparmann assures us, is by no means the case; the overplus being the produce of avarice, which, goaded on by the desire of gain, will always hit upon some method of satisfying the demands of luxury and sensuality. The votaries of these, accustomed to be put off with empty sounds, do not seldom drink with the highest relish an imaginary Constantia, with which, however, this liquor has nothing in common besides the mere name. It is therefore advisable, even at the Cape itself, to take care, that whilst one has a genuine sample given one to taste, one is not made to pay for a made-up red Constantia, which otherwise is in general sold for half the price. When a wine of this kind has been (as it usually is) meliorated by a voyage, and at the same time christened with the pompous name of genuine Constantia, of which it has indeed in some measure the flavour, it easily sells for such in Europe.

CONSTANTINA, a strong and considerable town of Africa, in the kingdom of Algiers, and capital of a territory of the same name. It is the largest and strongest place in all the eastern parts; and it is seated on the top of a great rock. There is no way to it but by steps cut out of the rock; and the usual way of punishing criminals here is to throw them down the cliff. Here are a great many Roman antiquities, particularly a triumphal arch. E. Long. 7. 12. N. Lat. 36. 4.

CONSTANTINA, a town of Spain, in Andalusia, and capital of a small territory of the same name, with a castle seated on a mountain. W. Long. 5. 35. N. Lat. 37. 40.

CONSTANTINE, a kingdom of Barbary of that name, in Africa. It is bounded on the north by the Mediterranean, on the east by the kingdom of Tunis, on the south by Bildulgerid, and on the west by the river Sufegmar, which separates it from the kingdom of Bugia. The country is the new Numidia of the ancients, and had its own king: but it is now a province to Algiers.

CONSTANTINE the Great, the first emperor of the
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Romans who embraced Christianity. His father, Constantius Chlorus, rendered himself famous by his victorious expeditions to Germany and Britain: upon the abdication of Dioclesian, he shared the Roman empire with Galerius Maximinus in 305, and was at that time at York, where he died in 306; having first caused his son Constantine the Great to be proclaimed emperor by his army, and by the English. Galerius at first refused to admit Constantine to his father's share in the imperial throne; but after having lost several battles, he consented in 308. Maxentius, who succeeded Galerius, opposed him: but was defeated, and drowned himself in the Tyber. The senate then declared Constantine chief or first Augustus, and Licinius his second associate in the empire, in 313. These princes published an edict, in their joint names, in favour of the Christians; but soon after Licinius, jealous of Constantine's renown, conceived an implacable hatred against him, and renewed the persecutions against the Christians. This brought on a rupture between the emperors, and a battle, in which Constantine was victorious. A short peace ensued: but Licinius having shamefully violated the treaty, the war was renewed; when Constantine totally defeating him, he fled to Nicomedia, where he was taken prisoner and strangled in 323. Constantine, now become sole master of the western and eastern empires, immediately formed the plan of establishing Christianity as the religion of the state; for which purpose, he convoked several ecclesiastical councils: but finding he was likely to meet with great opposition from the Pagan interest at Rome, he conceived the design of founding a new city, to be the capital of his Christian empire; see CONSTANTINOPLE. The glory Constantine had acquired by establishing the Christian religion, was tarnished by the part he took in the persecutions carried on by the Arians, towards the close of his reign, against their Christian brethren who differed from them: seduced by Eusebius of Nicomedia, he banished several eminent prelates; soon after which, he died in 337, the 66th year of his age, and 31st of his reign.

As to the character of Constantine, he was chaste, pious, laborious, and indefatigable; a great general, successful in war, and deserving his success by his shining valour and by the brightness of his genius; a protector of arts, and an encourager of them by his beneficence. If we compare him with Augustus, we shall find that he ruined idolatry, by the same precautions and the same address that the other used to destroy liberty. Like Augustus, he laid the foundation of a new empire; but less skilful, and less polite, he could not give it the same stability: he weakened the body of the state by adding to it, in some measure, a second head in the foundation of Constantinople; and transporting the centre of motion and strength too near the eastern extremity, he left without heat, and almost without life, the western parts, which soon became a prey to the barbarians. The Pagans were too much his enemies to do him justice. Eutropius says, that in the former part of his reign he was equal to the most accomplished princes, and in the latter to the meanest. The younger Victor, who makes him to have reigned more than 31 years, pretends, that in the first 10 years he was a hero; in the 12 succeeding ones

Constantine.

Constantine,
Constantinople.

ones a robber; and in the 10 last a spendthrift. It is easy to perceive, with respect to these two reproaches of Victor's, that the one relates to the riches which Constantine took from idolatry, and the other to those with which he loaded the church.

CONSTANTINE emperor of the East in 1002, left the care of the empire to his wife Helena, who loaded the people with taxes, and sold all the offices in church and state to the highest bidders; while the emperor employed himself in reading, writing, and the fine arts, till he became as good an architect and painter as he was a bad prince: he wrote several biographical and geographical works, which would have done honour to his name, if he had not neglected his duty to compose them. He died in 959.

CONSTANTINE (Dracos), the son of Emmanuel Paleologus, was placed on the throne by sultan Amurath in 1448. But Mahomet II. his successor, resolving to dethrone him, laid siege to Constantinople by sea and land, and took it by assault in 1453, after it had held out 58 days. The unfortunate emperor seeing the Turks enter the breaches, threw himself into the midst of the enemy, and was cut to pieces; the children of the imperial house were massacred by the soldiers; and the women reserved to gratify the lust of the conqueror: and thus terminated the dynasty of the Constantines, 1123 years after its establishment at Constantinople.

CONSTANTINE (Robert), a learned physician born at Caen, taught polite literature in that city; and acquired great reputation by his skill in the Greek language, in history, and in medicine. He died in 1603, aged 103. He wrote a dictionary in Greek and Latin and other works, which are esteemed.

1
Removing
the imperi-
al seat to
this city the
cause of the
decline of
the western
empire.

CONSTANTINOPLE, the modern name of the city of BYZANTIUM in Thrace. It was enlarged and beautified by the Roman emperor Constantine the Great, in the year 330. At the same time he transferred thither the seat of the empire; and this removal is generally thought to have been one of the principal causes of the sudden decline of the western empire after this period.

2
Constantine
defeats the
Goths,

In the year 332, the Sarmatians implored Constantine's assistance against the Goths, who had made an irruption into their territories, and destroyed every thing with fire and sword. The emperor readily granted their request, and gained a complete victory. Near 100,000 of the enemy perished, either in the battle, or after it with hunger and cold. In consequence of this overthrow, the Goths were obliged to sue for peace; but the ungrateful Sarmatians no sooner found themselves delivered from their enemies, than they turned their arms against their benefactor, and ravaged the provinces of Mæsia and Thrace. The emperor, receiving intelligence of this treachery, returned with incredible expedition, cut great numbers of them in pieces, and obliged the rest to submit to what terms he was pleased to impose.

3
And the
Sarmatians,

4
Is highly
respected.

Constantine seems to have been a prince very highly respected, even by far distant nations. In 333, according to Eusebius, ambassadors arrived at Constantinople from the Blemyes, Indians, Ethiopians, and Persians, courting his friendship. They were received in a most obliging manner; and learning from the ambassadors of Sapor king of Persia, that there were great

numbers of Christians in their master's dominions, Constantine wrote a letter in their behalf to the Persian monarch.

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history.

Next year, the Sarmatians being again attacked by the Goths, found themselves obliged to set at liberty and arm their slaves against them. By this means they indeed overcame the Goths; but the victorious slaves turning their arms against their masters, drove them out of the country. This misfortune obliged them, to the number of 300,000, to apply for relief to the Roman emperor, who incorporated with his legions such as were capable of service; and gave settlements to the rest in Thrace, Scythia, Macedon, and Italy. This was the last remarkable action of Constantine the Great. He died on May 15. 337, having divided the empire among his children and nephews, in the following manner. Constantine, his eldest son, had Gaul, Spain, and Britain; Constantius, the second, had Asia, Syria, and Egypt; and Constans, the youngest, Illyricum, Italy, and Africa. To his nephew Dalmatius, he gave Thrace, Macedon, and Achaia; and to King Annibalianus, his other nephew, Armenia Minor, Pontus, Cappadocia, and the city of Cæsarea, which he desired might be the capital of his kingdom.

After the death of Constantine, the army and senate proclaimed his three sons emperors, without taking any notice of his two nephews, who were soon after murdered, with Julius Constantius the late emperor's brother, and all their friends and adherents. Thus the family of Constantine was at once reduced to his three sons, and two nephews Gallus and Julian, the sons of Julius Constantius; and of these the former owed his life to a malady, from which no one thought he could recover; and the latter to his infancy, being then at most about seven years of age. The three brothers divided among themselves the dominions of the deceased princes; but did not long agree together. In 340, Constantine having in vain solicited Constans to yield part of Italy to him, raised a considerable army; and under pretence of marching to the assistance of his brother Constantius, who was then at war with the Persians, made himself master of several places in Italy. Hereupon Constans detached part of his army against him; and Constantine, being drawn into an ambuscade near Aquileia, was cut off with his whole forces. His body was thrown into the river Ansa; but being afterwards discovered, was sent to Constantinople, and interred there near the tomb of his father.

By the defeat and death of his brother, Constans remained sole master of all the western part of the empire, in the quiet possession of which he continued till the year 350. This year, Magnentius, the son of one Magnus, a native of Germany, finding Constans despised by the army on account of his indolence and inactivity, resolved to murder him, and set up for himself. Having found means to gain over the chief officers of the army to his designs, he seized on the imperial palace at Autun, and distributed among the populace what sums he found there; which induced not only the city, but the neighbouring country, to espouse his cause. But Constans being informed of what had passed, and finding himself unable to resist the usurper, fled towards Spain. He was overtaken, however, by Gaiso, whom Magnentius had sent after him with a chosen

5
He takes a
number of
Sarmatians
into his
army.

6
His death,
and divi-
sion of the
empire.

7
All his rela-
tions mur-
dered ex-
cept his
three sons
and two
nephews.

8
Constantine
invades
the domini-
ons of Con-
stans.

9
Is defeated
and killed.

10
Constans
sole master
of the West.

11
Magnen-
tius revolts
against him.

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12
Constantius murdered.

13
Three pretenders to the empire.

14
Nepotianus makes himself master of Rome.

15
He is defeated and killed.

16
Tyranny of Magnentius.

17
Sends proposals of peace to Constantius.

chosen body of troops, who dispatched with many wounds the unhappy prince at Helena, a small village situated near the foot of the Pyrenees.

Thus Constantius acquired a right to the whole Roman empire; though one half of it was seized by Magnentius after the murder of Constantius. The former had been engaged in a war with the Persians, in which little advantage was gained on either side; but the Persians now giving no more disturbance, the emperor marched against the usurpers in the west. Besides Magnentius, there were at this time two other pretenders to the western empire. Veteranio, general of the foot in Pannonia, had, on the first news of the death of Constantius, caused himself to be proclaimed emperor by the legions under his command. He was a native of Upper Mæsia, and advanced in years when he usurped the sovereignty; but so illiterate, that he then first learned to read. The third pretender was Flavius Popilius Nepotianus, son of Eutropia the sister of Constantine the Great. Having assembled a company of gladiators and men of desperate fortunes, he assumed the purple on the 3d of June 350, and in that attire presented himself before the gates of Rome. The prefect Anicetus, who commanded there for Magnentius, sallied out against him with a body of Romans; who were soon driven back into the city. Soon after Nepotianus made himself master of the city itself, which he filled with blood and slaughter. Magnentius being informed of what had happened, sent against this new competitor his chief favourite and prime minister Marcellinus. Nepotianus received him with great resolution; a bloody battle ensued between the soldiers of Magnentius and the Romans who had espoused the cause of Nepotianus; but the latter being betrayed by a senator, named Heraclitus, his men were put to flight, and he himself killed, after having enjoyed the sovereignty only 28 days. Marcellinus ordered his head to be carried on the point of a lance through the principal streets of the city; put to death all those who had declared for him; and under pretence of preventing disturbances, commanded a general massacre of all the relations of Constantine. Soon after, Magnentius himself came to Rome to make the necessary preparations for resisting Constantius, who was exerting himself to the utmost in order to revenge the death of his brother. In the city he behaved most tyrannically, putting to death many persons of distinction, in order to seize their estates; and obliged the rest to contribute half of what they were worth towards the expence of the war. Having by this means raised great sums, he assembled a mighty army composed of Romans, Germans, Gauls, Franks, Britons, Spaniards, &c. At the same time, however, dreading the uncertain issues of war, he dispatched ambassadors to Constantius with proposals of accommodation. Constantius set out from Antioch about the beginning of autumn; and, passing through Constantinople, arrived at Heraclea, where he was met by the deputies from Magnentius, and others from Veteranio, who had agreed to support each other in case the emperor would hearken to no terms. The deputies of Magnentius proposed in his name a match between him and Constantia, or rather Constantina, the sister of Constantius, and widow of Annibalianus; offering, at the same time, to Constantius the sister of Magnentius,

At first the emperor would hearken to no terms; but afterwards that he might not have to oppose two enemies at once, concluded a separate treaty with Veteranio, by which he agreed to take him for his partner in the empire. But when Veteranio ascended the tribunal along with Constantius, the soldiers pulled him down from thence, crying out, That they would acknowledge no other emperor than Constantius alone. On this Veteranio threw himself at the emperor's feet, and implored his mercy. Constantius received him with great kindness, and sent him to Prusia in Bithynia, where he allowed him a maintenance suitable to his quality.

Constantius, now master of all Illyricum, and of the army commanded by Veteranio, resolved to march against Magnentius without delay. In the mean time, however, on advice that the Persians were preparing to invade the eastern provinces, he married his sister Constantina to his cousin-german Gallus; created him Cæsar on the 15th of March; and allotted him for his share not only all the East, but likewise Thrace and Constantinople. About the same time Magnentius gave the title of Cæsar to his brother Decentius, whom he dispatched into Gaul to defend that country against the barbarians who had invaded it; for Constantius had not only stirred up the Franks and Saxons to break into that province by promising to relinquish to them all the places they should conquer, but had sent them large supplies of men and arms for that purpose. On this encouragement the barbarians invaded Gaul with a mighty army, overthrew Decentius in a pitched battle, committed every where dreadful ravages, and reduced the country to a most deplorable situation. In the mean time Magnentius having assembled a numerous army, left Italy, and crossing the Alps, advanced into the plains of Pannonia, where Constantius, whose main strength consisted in cavalry, was waiting for him. Magnentius, hearing that his competitor was encamped at a small distance, invited him by a messenger to the extensive plains of *Sciscia* on the Save, there to decide which of them had the best title to the empire. This challenge was by Constantius received with great joy; but as his troops marched towards *Sciscia* in disorder, they fell into an ambuscade, and were put to flight with great slaughter. With this success, Magnentius was so elated, that he rejected all terms of peace which were now offered by Constantius; but after some time, a general engagement ensued at *Mursa*, in which Magnentius was entirely defeated, with the loss of 24,000 men. Constantius, though victor, is said to have lost 30,000, which seems improbable. All authors, however, agree, that the battle of *Mursa* proved fatal to the western empire, and greatly contributed to its speedy decline.

After his defeat at *Mursa*, Magnentius retired into Italy, where he recruited his shattered forces as well as he could. But the beginning of the following year 352, Constantius, having assembled his troops, surprised and took a strong castle on the Julian Alps, belonging to Magnentius, without the loss of a man. After this the emperor advanced in order to force the rest; upon which Magnentius was struck with such terror, that he immediately abandoned *Aquileia*, and ordered the troops that guarded the other passes of the Alps to follow

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18
Gallus sent against the Persians.

19
Constantius stirs up the Franks to invade Gaul.

20
Is defeated by Magnentius.

21
Magnentius defeated at *Mursa*.

22
This battle fatal to the empire.

Constantinopolitan history.

follow him. Thus Constantius entering Italy without opposition, made himself master of Aquileia. From thence he advanced to Pavia, where Magnentius gained a considerable advantage over him. Notwithstanding this loss, however, Constantius reduced the whole country bordering on the Po, and Magnentius's men deserted to him in whole troops, delivering up to him the places they had garrisoned; by which the tyrant was so disheartened, that he left Italy, and retired with all his forces into Gaul. Soon after this, Africa, Sicily, and Spain, declared for Constantius; upon which Magnentius sent a senator, and after him some bishops, to treat of a peace; but the emperor treated the senator as a spy, and sent back the bishops without any answer.—Magnentius now finding his affairs desperate, and that there were no hopes of pardon, recruited his army in the best manner he could, and dispatched an assassin into the East to murder Gallus Cæsar; hoping that his death would oblige the emperor to withdraw his forces from Gaul, and march in person to the defence of the Eastern provinces, which were threatened by the Persians. The assassin gained over some of Gallus's guards; but the plot being discovered before it could be put in execution, they were all seized and executed as traitors.

23
Magnentius attempts to get Gallus murdered.

24
Magnentius defeated a second time, kills all his family and himself.

In 353, the war against Magnentius was carried on with more vigour than ever, and at last happily ended by a battle fought in the Higher Dauphiny. Magnentius, being defeated, took shelter in Lyons; but the few soldiers who attended him, despairing of any further success, resolved to purchase the emperor's favour by delivering up to him his rival, the author of so calamitous a war. Accordingly they surrounded the house where he lodged; upon which the tyrant, in despair, slew with his own hand his mother, his brother Desiderius whom he had created Cæsar, and such of his friends and relations as were with him; and then, fixing his sword in a wall, threw himself upon it, in order to avoid a more shameful death which he had reason to apprehend.

25
Constantius sole master of the empire.

After the death of Magnentius, his brother Decentius Cæsar, who was marching to his assistance, and had already reached Sens, finding himself surrounded on all sides by the emperor's forces, chose rather to strangle himself than fall alive into the hands of his enemies. Thus Constantius was left sole master of the Roman empire. His panegyrist tells us, that after his victory he behaved with the greatest humanity, forgiving and receiving into favour his greatest enemies; but other historians differ considerably from them, and tell us that Constantius now became haughty, imperious, and cruel, of which many instances are given.

26
Many grievous calamities.

This year the empire was subjected to very grievous calamities. Gaul was ravaged by the barbarians beyond the Rhine, and the disbanded troops of Magnentius. At Rome, the populace rose on account of a scarcity of provisions. In Asia, the Isaurian robbers over-ran Lycaonia and Pamphylia; and even laid siege to Seleucia, a city of great strength; which, however, they were not able to make themselves masters of. At the same time, the Saracens committed dreadful ravages in Mesopotamia, the Persians also invaded the province of Anthemusia on the Euphrates. But the Eastern provinces were not so much harassed by

the barbarians as By Gallus Cæsar himself, who ought to have protected them. That prince was naturally of a cruel, haughty, and tyrannical disposition; but being elated with his successes against the Persians, he at last behaved more like a tyrant and a madman than a governor. His natural cruelty is said to have been heightened by the instigations of his wife Constantina, who is by Ammianus styled the *Megara*, or "fury of her sex." and he adds, that her ambition was equal to her cruelty. Thus all the provinces and cities in the East were filled with blood and slaughter. No man, however innocent, was sure to live or enjoy his estate a whole day; for Gallus's temper being equally suspicious and cruel, those who had any private enemies took care to accuse them of crimes against the state, and with Gallus it was the same thing to be accused and condemned. At last the emperor being informed from all quarters of the evil conduct of his brother-in-law, and being at the same time told that he aspired to the sovereignty, resolved upon his ruin. For this end he wrote letters to Gallus and Constantina, inviting them both into Italy. Though they had both sufficient reason to fear the worst, yet they durst not venture to disobey the emperor's express command. Constantina, who was well acquainted with her brother's temper, and hoped to pacify him by her artful insinuations, set out first, leaving Gallus at Antioch: but she had scarce entered the province of Bithynia, when she was seized with a fever which put an end to her life. Gallus now despairing of being able to appease his sovereign, thought of openly revolting; but most of his friends deserted him on account of his inconstant and cruel temper, so that he was at last obliged to submit to the pleasure of Constantius. He advanced therefore, according to his orders; but at Petauivum was arrested, and stripped of all the ensigns of his dignity. From thence he was carried to *Flanona*, now *Fianone* in Dalmatia, where he was examined by two of his most inveterate enemies. He confessed most of the crimes laid to his charge; but urged as an excuse the evil counsels of his wife Constantina. The emperor, provoked at this plea which reflected on his sister, and instigated by the enemies of Gallus, signed a warrant for his execution, which was performed accordingly.

Constantinopolitan history.

27
Tyranny of Gallus.

28
He is put to death.

29
War with the Germans.

All this time the emperor had been engaged in a war with the Germans: he had marched against them in person; and though he gained no advantage, the barbarians thought proper to make peace with him. This, however, was but short-lived. No sooner was the Roman army withdrawn, than they began to make new inroads into the empire. Against them Constantius dispatched Arbetio with the flower of the army; but he fell into an ambuscade, and was put to flight with the loss of a great number of men. This loss, however, was soon retrieved by the valour of *Arintheus*, who became famous in the reign of Valens, and of two other officers, who falling upon the Germans, without waiting the orders of their general, put them to flight, and obliged them to leave the Roman territories.

The tranquillity of the empire, which ensued on this repulse of the Germans, was soon interrupted by a pretended conspiracy, by which in the end a true one was produced. Sylvanus, a leading man among the

Constantinopolitan history.

30
Sylvanus betrayed by Arbetio.

31
He is forced to revolt.

[31]
Is murdered.

32
Gaul ravaged by the barbarians.

33
Julian created Cæsar.

the Franks, commanded in Gaul, and had there performed great exploits against the barbarians. He had been raised to this post by Arbetio; but only with a design to remove him from the emperor's presence, in order to accomplish his ruin, which he did in the following manner: One *Dynames*, keeper of the emperor's mules, leaving Gaul, begged of Sylvanus letters of recommendation to his friends at court; which being granted, the traitor erased all but the subscription. He then inserted directions to the friends of Sylvanus for the carrying on a conspiracy: and delivering these forged letters to the prefect *Lamprius*, they were by him showed to the emperor. Thus Sylvanus was forced to revolt, and cause himself to be proclaimed emperor by the troops under his command. In the mean time, however, *Dynames* having thought proper to forge another letter, the fraud was discovered, and an enquiry set on foot, which brought to light the whole matter. Sylvanus was now declared innocent, and letters sent to him by the emperor confirming him in his post; but these were scarce gone, when certain news arrived at the court of Sylvanus having revolted, and caused himself be proclaimed emperor. Constantius, thunderstruck at this news, dispatched against him *Urficinus*, an officer of great integrity, as well as valour and experience in war; who forgetting his former character, pretended to be Sylvanus's friend, and thus found means to cut him off by treachery.

The barbarians, who had been hitherto kept quiet by the brave Sylvanus, no sooner heard of his death, than they broke into Gaul with greater fury than ever. They took and pillaged above forty cities, and among the rest Cologne, which they levelled with the ground. At the same time the *Quadi* and *Sarmatians* entering *Pannonia*, destroyed every thing with fire and sword. The *Persians* also, taking advantage of the absence of *Urficinus*, over-ran, without opposition, *Armenia* and *Mesopotamia*; *Prosper* and *Mausonianus*, who had succeeded that brave commander in the government of the East, being more intent upon pillaging than defending the provinces committed to their care. Constantius, not thinking it advisable to leave Italy himself, resolved at last to raise his cousin Julian, the brother of *Gallus*, to the dignity of Cæsar. Julian seems to have been a man of very extraordinary talents; for though before this time he had been entirely buried in obscurity, and conversed only with books, no sooner was he put at the head of an army than he behaved with the same bravery, conduct, and experience, as if he had been all his life bred up to the art of war. He was appointed governor of Gaul; but before he set out, Constantius gave him in marriage his sister *Helena*, and made him many valuable presents. At the same time, however, the jealous emperor greatly limited his authority; gave him written instructions how to behave; ordered the generals who served under him to watch all his actions no less than those of the enemy; and strictly enjoined Julian himself not to give any largesses to the soldiery.

Julian set out from Milan on the 1st of December 355, the emperor himself accompanying him as far as Pavia, from whence he pursued his journey to the Alps, attended only by 360 soldiers. On his arrival at Turin he was first acquainted with the loss of Co-

logne, which had been kept concealed from the emperor. He arrived at Vienne before the end of the year, and was received by the people of that city and the neighbourhood with extraordinary joy.

In 356, the barbarians besieged *Autun*; to relieve which place, Julian marched with what forces he could raise. When he came there, he found the siege raised: on which he went in pursuit of the barbarians to Auxerre, crossing with no small danger thick woods and forests, from Auxerre to *Troies*. On his march he was surrounded on all sides by the barbarians, who moved about the country in great bodies; but he put them to flight with an handful of men, cut great numbers of them in pieces, and took some prisoners. From *Troies* he hastened to Rheims, where the main body of the army, commanded by *Marcellus*, waited his arrival. Leaving Rheims, he took his route towards *Decempagi*, now *Dieuze*, on the *Seille* in *Lorraine*, with a design to oppose the Germans who were busy in ravaging that province. But the enemy attacking his rear unexpectedly, would have cut off two legions, had not the rest of the army, alarmed at the sudden noise, turned back to their assistance. A few days afterwards he defeated the Germans, though with great loss to his own army; the victory, however, opened him a way to Cologne. This city he found abandoned by the barbarians. They had neglected to fortify it: but Julian commanded the ancient fortifications to be repaired with all possible expedition, and the houses to be rebuilt; after which he retired to Sens, and there took up his winter-quarters. This year also Constantius entered Germany on the side of *Rhætia*, laid waste the country far and wide; and obliged the barbarians to sue for peace, which was readily granted. The same year he enacted two laws; by one of which it was declared capital to sacrifice, or pay any kind of worship, to idols; the other, granting the effects of condemned persons to belong to their children and relations within the third degree, except in cases of magic and treason; but this last one he revoked two years after.

In the beginning of the year 357, the barbarians besieged Julian a whole month in Sens; *Marcellus*, the commander in chief, never once offering to assist him. Julian, however, so valiantly defended himself with the few forces he had, that the barbarians at last retired. After this, Constantius declared Julian commander in chief of all the forces in Gaul; appointing under him one *Severus*, an officer of great experience, and of a quite different disposition from *Marcellus*. On his arrival in Gaul, Julian received him with great joy, raised new troops, and supplied them with arms which he luckily found in an old arsenal. The emperor, resolving at all events to put a stop to the terrible devastations committed by the barbarous nations, chiefly by the *Alemans*, wrote to Julian to march directly against them. At the same time he sent *Barbatio*, who had been appointed general in place of Sylvanus, with a body of 25 or 30,000 men, out of Italy, in order to inclose the enemy between two armies. The *Leti*, however, a German nation, passing between the armies, advanced as far as Lyons, hoping to surprise that wealthy city; but meeting with a warmer reception than they expected, contented themselves with ravaging the country all round it. On the first

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34
He sets out for Gaul.

35
Defeats the barbarians.

36
Repairs the fortifications of Cologne.

37
Idolatry declared capital by Constantius.

notice:

Constantinopolitan history.

38
The Leti cut off by Julian.

39
He forces the barbarians to abandon the islands of the Rhine.

40
Entirely defeats them at Strasbourg

41
He enters Germany and concludes a truce with the barbarians.

42
Remarkable laws of Constantius.

notice of this expedition, Julian detached strong parties to guard the passages through which he knew the barbarians must return. Thus they were all cut off except those who marched near the camp of Barbatio; who was so far from cutting off their retreat, that he complained by a letter to Constantius of some officers for attempting it. These officers, among whom was Valentinian afterwards emperor of the West, were, by the orders of Constantius, cashiered for their disobedience. The other barbarians either fortified themselves in the countries which they had seized, stopping up all the avenues with huge trees, or took shelter in the islands formed by the Rhine. Julian resolved first to attack the latter; and with this view demanded some boats of Barbatio: but he, instead of complying with his just request, immediately burnt all his boats, as he did on another occasion the provisions which had been sent to both armies, after he had plentifully supplied his own. Julian, not in the least disheartened with this unaccountable conduct, persuaded some of the most resolute of his men to wade over to one of the islands. Here they killed all the Germans who had taken shelter in it. They then seized their boats, and pursued the slaughter in several other islands, till the enemy abandoned them all, and retired to their respective countries with their wives and what booty they could carry. On their departure, Barbatio attempted to lay a bridge of boats over the Rhine; but the enemy, apprised of his intention, threw a great number of huge trees into the river, which being carried by the stream against the boats, sunk several of them, and parted the rest. The Roman general then thought proper to retire; but the barbarians falling unexpectedly upon him in his retreat, cut great numbers of his men in pieces, took most of his baggage, laid waste the neighbouring country, and returned in triumph loaded with booty. Elated with this success, they assembled in great numbers under the command of *Chnodomarius*, a prince of great renown among them, and six other kings. They encamped in the neighbourhood of Strasbourg. Here they were encountered by Julian; who put them to flight, with the loss of 6 or 8000 of their men slain in the field, and a vastly greater number drowned in the river; while Julian himself lost only 243 private men and four tribunes. In this action *Chnodomarius* was taken, and sent to Rome, where he soon after died.

After the battle, Julian advanced with all his army to Mayence, where he built a bridge over the Rhine and entered Germany, having with difficulty prevailed upon his army to follow him. Here he ravaged the country till the time of the autumnal equinox, when being prevented by snow from advancing any further, he began to repair the fort of Trajan, by some supposed to be the castle of Cromburgh, about three or four leagues from Frankfort. The barbarians were now so much alarmed, that they sent deputies to treat of a peace; but this Julian refused to grant them upon any terms. He consented, however, to a truce for seven months, upon their promising to store with provisions the fort he was building in their country. This year Constantius made some remarkable laws. By one he punished with confiscation such as renounced the Christian for the Jewish religion; and by another, ad-

ressed to Felix bishop of Rome, he exempted all merchandizing ecclesiastics, with their wives, children, and domestics, from every imposition ordinary and extraordinary: supposing the gains they made to be applied by them to the relief of the poor.

In 358, as soon as the season was fit for action, Julian took the field against the Franks, with a design to conquer them before the truce he had concluded with the Alemans was expired. The Franks were at that time divided into several tribes, the most powerful of which were the *Salii* and *Chamavi*. The first of these sent deputies, intreating that he would suffer them to remain as friends to the empire in the country they possessed. But Julian, without paying any regard to this deputation, entered their country, and obliged them to submit; after which he allotted them lands in Gaul, incorporating great numbers of them into his cavalry. He next marched against the *Chamavi*, whom he defeated and obliged to retire beyond the Rhine. Afterwards he rebuilt three forts on the river *Meuse*, which had been destroyed by the barbarians; but wanting provisions in a country so often ravaged, he ordered 6 or 800 vessels to be built in Britain for the conveying corn from thence into Gaul. Julian continued in the country of the *Chamavi* till the expiration of his truce with the Alemans; and then laying a bridge of boats over the Rhine, he entered their country, putting all to fire and sword. At last two of their kings came in person to him to sue for peace: which Julian granted, upon their promising to set at liberty the captive they had taken; to supply a certain quantity of corn when required; and to furnish wood, iron, and carriages, for repairing the cities they had ruined. The prisoners whom he at this time released, amounted to upwards of 20,000.

Soon after the vernal equinox of this year 358, Constantius marched in person against the *Quadi* and *Sarmatians*, whose country lay beyond the Danube. Having crossed that river on a bridge of boats, he laid waste the territories of the *Sarmatians*; who thereupon came in great numbers, together with the *Quadi*, pretending to sue for peace. Their true design was to surprise the Romans; but the latter suspecting it, fell upon them sword in hand, and cut them all in pieces. This obliged the rest to sue for peace in good earnest, which was granted on the delivery of hostages. The emperor then marched against the *Limigantes*, that is, the slaves who, in 334, had driven the *Sarmatians* out of their country, and seized it for themselves*. They used the same artifice as the *Sarmatians* and *Quadi* had done, coming in great numbers under pretence of submitting, but prepared to fall upon him unexpectedly if opportunity offered. The emperor, observing their surlly looks, and distrusting them, caused his troops surround them insensibly while he was speaking. The *Limigantes* then displeased with the conditions he offered them, laid their hands on their swords: on which they were attacked by the Roman soldiers. Finding it impossible to make their escape, they made with great fury towards the tribunal, but were repulsed by the guards forming themselves into a wedge, and every one of them cut in pieces. After this, the emperor ravaged their country to such a degree, that they were in the end obliged to submit to the only condition he thought proper to allow them, which was to quit their country,

Constantinopolitan history.

43
Julian conquers the Franks.

44
Grants a peace to the Germans.

45
Expedition of Constantius against some German nations.

* See n° 5.

46
He expels the Limigantes.

Constantinopolitan history.

47
Haughty embassy from Sapor king of Persia.

country, and retire to a more distant place. The country was then restored to the Sarmatians who were its original possessors.

This year is also remarkable for a very haughty embassy from Sapor king of Persia. The ambassador, named *Narfes*, brought a letter, in which the Persian monarch styled himself "king of kings, brother of the sun and moon," &c. He acquainted the emperor that he might lawfully insist on having all the countries beyond the river Strymon in Macedon delivered up to him; but lest his demands should seem unreasonable, he would be contented with Armenia and Mesopotamia, which had been most unjustly taken from his grandfather *Narfes*. He added, that unless justice was done him, he was resolved to assert his right by force of arms. This letter was presented to Constantius wrapped up in a piece of white silk; but he, without entering into any negotiation with the ambassador, wrote a letter to Sapor, in which he told him, that as he had maintained the Roman dominions in their full extent, when he was possessed only of the East, he could not suffer them to be curtailed now when he was master of the whole empire. In a few days, however, he sent another letter with rich presents; being very desirous at least to put off the war till he had secured the northern provinces against the incursions of the barbarians, that he might then employ all the forces of the empire against so formidable an enemy. This embassy proved unsuccessful, as did also another which was sent soon after. The last ambassadors were imprisoned as spies, but afterwards dismissed unhurt. By a law of Constantius dated in 358, all magicians, augurs, astrologers, and pretenders to the art of divination, were declared enemies to mankind; and such of them as were found in the court either of the emperor or of Julian, he commanded to be put to the torture, and specified what torments they were to undergo.

48
A law against magicians, &c.

49
Treachery of the Limigantes.

In 359, Julian continued his endeavours for relieving the province of Gaul, which had suffered so much from the incursions of the barbarians. He erected magazines in different places, visited the cities which had suffered most, and gave orders for repairing their walls and fortifications properly. He then crossed the Rhine, and pursued the war in Germany with great success, inasmuch that the barbarians submitted to such terms as he pleased to impose. In the mean time the emperor, having received intelligence that the Limigantes had quitted the country in which he had placed them, hastened to the banks of the Danube, in order to prevent their entering Pannonia. On his arrival he sent deputies, desiring to know what had induced them to abandon the country which had been allotted them. The Limigantes answered, in appearance with the greatest submission imaginable, that they were willing to live as true subjects of the empire in any other place; but that the country he had allotted them was quite uninhabitable, as they could demonstrate if they were but allowed to cross the river, and lay their complaints before him. This request was granted; but while he ascended his tribunal, the barbarians unexpectedly fell upon his guards sword in hand, killed several of them, and the emperor with difficulty saved himself by flight. The rest of the troops, however, soon took the alarm, and surrounding the Limigantes,

50
They are all cut off.

cut them all off to a man. This year Constantius instituted a court of inquisition against all those who consulted heathen oracles. Paulus Catena, a noted and cruel informer, was dispatched into the East to prosecute them; and Modestus, then count of the East, and equally remarkable for his cruelty, was appointed judge. His tribunal was erected at Scythopolis in Palestine, whither persons of both sexes, and of every rank and condition, were daily dragged in crowds from all parts, and either confined in dungeons, or torn in pieces in a most cruel and barbarous manner by racks, or publicly executed.

Constantinopolitan history.

51
The heathens cruelly persecuted.

In 359, Sapor king of Persia began hostilities, being encouraged thereto by the absence of Ursicinus, whom the emperor had recalled, and appointed in his room one Sabinianus, a person very unfit for such an office. During this campaign, however, he made very little progress; having only taken two Roman forts, and destroyed the city of Amida, the siege of which is said to have cost him 30,000 men. On the first news of the Persian invasion, Constantius had thought proper to send Ursicinus into the East; but his enemies prevented him from receiving the supplies necessary for carrying on the war, so that he found it impossible to take any effectual means for stopping the progress of the Persians. On his return, he was unexpectedly charged with the loss of Amida, and all the disasters that had happened during the campaign. Two judges were appointed to inquire into his conduct; but they, being creatures of his enemies, left the matter doubtful. On this Ursicinus was so much exasperated, that he appealed to the emperor, and in the heat of passion, let fall some unguarded expressions, which being immediately carried to the emperor, the general was deprived of all his employments.

52
The Persians begin hostilities.

Constantius resolved to march next year in person against the Persians; but in the mean time, dreading to encounter so formidable an enemy, he applied himself wholly to the assembling of a mighty army, by which he might be able fully to cope with them. For this purpose he wrote to Julian to send him part of his forces, without considering that by so doing he left the province of Gaul exposed to the ravages of the barbarians. Julian resolved immediately to comply with the emperor's orders; but at the same time to abdicate the dignity of Cæsar, that he might not be blamed for the loss of the province. Accordingly he suffered the best soldiers to be draughted out of his army. They were, however, very unwilling to leave him, and at last proclaimed him emperor. Whether this was done absolutely against Julian's consent or not is uncertain; but he wrote to the emperor, and persuaded the whole army also to send a letter along with his, in which they acquainted Constantius with what had happened, and entreated him to acknowledge Julian as his partner in the empire. But this was positively refused by Constantius, who began to prepare for war. Julian then, designing to be before-hand with the emperor, caused his troops take an oath of allegiance to himself, and with surprising expedition made himself master of the whole country of Illyricum, and the important pass separating that country from Thrace. Constantius was thunder-struck with this news; but hearing that the Persians had retired, he marched with

53
Constantius marches in person against them.

54
Julian proclaimed emperor.

Constantinopolitan history.

55
Constantius marches against him, but dies.

56
Julian restores the heathen religion.

with all his force against his competitor. On his arrival at Tarsus in Cilicia, he was seized with a feverish distemper, occasioned chiefly by the uneasiness and perplexity of his mind. He pursued his march, however, to Mopsucene, a place on the borders of Cilicia, at the foot of mount Taurus. Here he was obliged to stop by the violence of his disorder, which increased every day, and at last carried him off on the 13th of November 361, in the 45th year of his age.

By the death of Constantius Julian now became master of the whole Roman empire without a rival. He had been educated in the Christian religion; but secretly apostatized from it long before, and as soon as he saw himself master of Illyricum, openly avowed his apostasy, and caused the temples of the gods to be opened. When the messengers arrived at Naissus in Illyricum, where he then was, to acquaint him with his being sole master of the empire, they found him consulting the entrails of victims concerning the event of his journey. As the omens were uncertain, he was at that time very much embarrassed and perplexed; but the arrival of the messengers put an end to all his fears, and he immediately set out for Constantinople. At Heraclea he was met by almost all the inhabitants of this metropolis, into which he made his public entry on the 11th of December 361, being attended by the whole senate in a body, by all the magistrates, and by the nobility magnificently dressed, every one testifying the utmost joy at seeing such a promising young prince raised to the empire without bloodshed. He was again declared emperor by the senate of Constantinople; and as soon as that ceremony was over, he caused the obsequies of Constantius to be performed with great pomp.

57
Condemns some of the late emperor's ministers.

The first care of Julian was to inquire into the conduct of the late emperor's ministers. Several of these having been found guilty of enormous crimes, were condemned and executed; particularly the noted informer Paulus Catena, and another named *Apodamus*, were sentenced to be burnt alive. Along with these, however, was put to death one Ursula, a man of unexceptionable character, and to whom Julian himself was highly indebted. He had been supplied with money by Ursula unknown to the emperor, at the time when he was sent into Gaul with the title of Cæsar, but without the money necessary for the support of that dignity. For what reason he was now put to death, historians do not acquaint us. Julian himself tells us, that he was executed without his knowledge.

58
Reforms the court.

The emperor next set about reforming the court. As the vast number of offices was in his time become an intolerable burden, he discharged all those whom he thought useless. He reduced, among the rest, the officers called *agentes in rebus*, from 10,000 to 17; and discharged thousands of cooks, barbers, &c. who by their large salaries drained the exchequer. The *curiosi*, whose office it was to inform the emperor of what had passed in the different provinces, were all discharged, and that employment entirely suppressed. Thus he was enabled to ease the people of the heavy taxes with which they were loaded: and this he did by abating a fifth part of all taxes and imposts throughout the kingdom.

As to religious matters, Julian, as before observed,

was a Pagan, and immediately on his accession to the throne restored the heathen religion. He invited to court the philosophers, magicians, &c. from all parts; nevertheless, he did not raise any persecution against the Christians. On the contrary, he recalled from banishment all the orthodox bishops who had been sent into exile during the former reign; but with a design, as is observed both by the Christian and Pagan writers, to raise disturbances and sow dissensions in the church.

Constantinopolitan history.

59
Recalls the philosophers, magicians, &c.

As the Persians were now preparing to carry on the war with vigour, Julian found himself under a necessity of marching against them in person. But before he set out, he enriched the city of Constantinople with many valuable gifts. He formed a large harbour to shelter the ships from the south wind, built a magnificent porch leading to it, and in another porch a stately library, in which he lodged all his books. In the month of May, A. D. 362, he set out for Antioch; and on the first of January renewed in that city the sacrifices to Jupiter for the safety of the empire, which had been so long omitted. During his stay in this city, he continued his preparations for the Persian war, erecting magazines, making new levies, and above all consulting the oracles, aruspices, magicians, &c. The oracles of Delphi, Delos, and Dodona, assured him of victory. The aruspices, indeed, and most of his courtiers and officers, did all that lay in their power to divert him from his intended expedition; but the deceitful answers of the oracles and magicians, and the desire of adding the Persian monarch to the many kings he had already seen humbled at his feet, prevailed over all other considerations. Many nations sent deputies to him offering their assistance; but these offers he rejected, telling them that the Romans were to assist their allies, but stood in no need of any assistance from them. He likewise rejected, and in a very disobliging manner, the offers of the Saracens; answering them, when they complained of his stopping the pension paid them by other emperors, that a warlike prince had steel, but no gold; which they resenting, joined the Persians, and continued faithful to them to the last. However, he wrote to Arsaces king of Armenia, enjoining him to keep his troops in readiness to execute the orders he should soon transmit to him.

Having made the necessary preparations for so important an enterprise, Julian sent orders to his troops to cross the Euphrates, designing to enter the enemy's country before they had the least notice of his march; for which purpose he had placed guards on all the roads. From Antioch he proceeded to Litarba, a place about 15 leagues distant, which he reached the same day. From thence he went to Beræa, where he halted a day, and exhorted the council to restore the worship of the gods; but this exhortation, it seems, was complied with but by few. From Beræa he proceeded to Batnæ; and was better pleased with the inhabitants of the latter, because they had, before his arrival, restored the worship of the gods. There he offered sacrifices; and having immolated a great number of victims, he pursued the next day his journey to Hierapolis, the capital of the province of Euphratesiana, which he reached on the 9th of March. Here he lodged in the house of one for whom he had a particular esteem, chiefly because neither Constantius nor Gallus,

60

Marches against the Persians.

61

Crosses the Euphrates.

Constantinopolitan history.

Gallus, who had both lodged in his house, had been able to make him renounce the worship of his idols. As he entered this city, 50 of his soldiers were killed by the fall of a porch. He left Hierapolis on the 13th of March; and having passed the Euphrates on a bridge of boats, came to Batnæ a small city of Osrhoene, about 10 leagues from Hierapolis; and here 50 more of his soldiers were killed by the fall of a stack of straw. From Batnæ he proceeded to Carrhæ; where, in the famous temple of the moon, it is said he sacrificed a woman to that planet.

62
Invades Persia.

While Julian continued in this city, he received advice that a party of the enemies horse had broke into the Roman territories. On this he resolved to leave an army in Mesopotamia, to guard the frontiers of the empire on that side, while he advanced on the other into the heart of the Persian dominions. This army consisted, according to some, of 20,000, according to others, of 30,000 chosen troops. It was commanded by Procopius, and Sebastian a famous manichean who had been governor of Egypt, and had persecuted there, with the utmost cruelty, the orthodox Christians. These two were to join, if possible, Arfaces king of Armenia, to lay waste the fruitful plains of Media, and meet the emperor in Assyria. To Arfaces Julian himself wrote, but in the most disobliging manner imaginable, threatening to treat him as a rebel if he did not execute, with the utmost punctuality, the orders given him; and at the conclusion told him, that the God he adored would not be able to screen him from his indignation.

There were two roads leading from Carrhæ to Persia; the one to the left by Nisibis; the other to the right through the province of Assyria, along the banks of the Euphrates. Julian chose the latter, but caused magazines to be erected on both roads; and, after having viewed his army, set out on the 25th of March. He passed the Abora, which separated the Roman and Persian dominions, near its conflux with the Euphrates; after which he broke down the bridge, that his troops might not be tempted to desert, seeing they could not return home. As he proceeded on his march, a soldier and two horses were struck dead by a flash of lightning; and a lion of an extraordinary size presenting himself to the army, was in a moment dispatched by the soldiers with a shower of darts. These omens occasioned great disputes between the philosophers and aruspices: the latter looking upon them as inauspicious, advised the emperor to return; but the former refuted their arguments with others more agreeable to Julian's temper.

63
Lays waste Assyria.

Having passed the Abora, Julian entered Assyria, which he found very populous, and abounding with all the necessaries of life; but he laid it waste far and near, destroying the magazines and provisions which he could not carry along with him; and thus he put it out of his power to return the same way he came; a step which was judged very impolitic. As he met with no army in the field to oppose him, he advanced to the walls of Ctesiphon, the metropolis of the Persian empire; having reduced all the strong holds that lay in his way. Here, having caused the canal to be cleared, which was formerly dug by Trajan between these two rivers, he conveyed his fleet from the former to the latter. On the banks of the Tigris he was op-

64
Advances to Ctesiphon.

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posed by the enemy. But Julian passed that river in spite of their utmost efforts, and drove them into the city with the loss of a great number of their men, he himself, in the mean time, losing only 70 or 75.

Constantinopolitan history.

65

Julian had now advanced so far into the enemy's country, that he found it necessary to think of a retreat, as it was impossible for him to winter in Persia. For this reason he made no attempt on Ctesiphon, but began to march back along the banks of the Tigris, soon after he had passed that river. In the mean time the king of Persia was assembling a formidable army, with a design to fall upon the Romans in their march; but being desirous of putting an end to so destructive a war, he sent very advantageous proposals of peace to Julian. These the Roman emperor very imprudently rejected; and soon after, deceived by treacherous guides, he quitted the river, and entered into an unknown country totally laid waste by the enemy, and where he was continually harassed by strong parties, who in a manner surrounded his army, and attacked him sometimes in the front, and sometimes in the rear. A still worse step he was persuaded to take by the treacherous guides already mentioned; and this was to burn his fleet, lest it should fall into the hands of the enemy. As soon as the fleet was set on fire, the whole army cried out, that the emperor was betrayed, and that the guides were traitors employed by the enemy. Julian ordered them immediately to be put to the rack, upon which they confessed the treason; but it was too late. The fleet was already in flames; they could by no means be extinguished; and no part was saved except 12 vessels, which were designed to be made use of in the building of bridges, and for this purpose were conveyed over land in waggons.

The emperor thus finding himself in a strange country, and his army greatly dispirited, called a council of his chief officers, in which it was resolved to proceed to Corduene, which lay south of Armenia, and belonged to the Romans. With this view, they had not proceeded far when they were met by the king of Persia, at the head of a very numerous army, attended by his two sons, and all the principal nobility of the kingdom. Several sharp encounters happened, in which, though the Persians were always defeated, yet the Romans reaped no advantages from their victories, but were reduced to the last extremity for want of provisions. In one of these skirmishes, when the Romans were suddenly attacked, the emperor, eager to repulse the enemy, hastened to the field of battle without his armour, when he received a mortal wound by a dart, which, through his arm and side, pierced his very liver. Of this wound he died the same night, the 26th of June 363, in the 32d year of his age, after having reigned scarce 20 months from the time he became sole master of the Roman empire.

66

Is mortally wounded in a sudden attack by the Persians.

67

As Julian had declined naming any successor, the choice of a new emperor devolved on the army. They unanimously chose Jovian, a very able commander, whose father had lately resigned the post of *comes domesticorum*, in order to lead a retired life. The valour and experience of Jovian, however, were not sufficient to extricate the Roman army from the difficulties in which they had been plunged by the imprudence of his predecessor. The famine raged in the camp

raised to the empire.

Z z

camp

Constantinopolitan history.

68
Concludes a peace with the Persians.

camp to such a degree, that not a single man would have been left alive, had not the Persians unexpectedly sent proposals of peace. These were now received with the utmost joy. A peace was concluded for 30 years; the terms of which were, that Jovian should restore to the Persians the five provinces which had been taken from them in the reign of Dioclesian, with several castles, and the cities of Nisibis and Singara. After the conclusion of the treaty, Jovian pursued his march without molestation. When he arrived at Antioch, he revoked all the laws that had been made in the former reign against Christianity and in favour of Paganism. He espoused also the cause of the orthodox Christians against the Arians; and recalled all those who had been formerly banished, particularly Athanasius, to whom he wrote a very obliging letter with his own hand. It is generally believed also that Athanasius, at the desire of Jovian, now composed the creed which still goes by his name, and is subscribed by all the bishops in Europe. But this emperor did not live to make any great alterations, or even to visit his capital as emperor; for in his way to Constantinople he was found dead in his bed, on the 16th or 17th of February 364, after he had lived 33 years, and reigned seven months and 40 days.

69
His death.

70
Valentinian chosen emperor, chooses Valens for his partner.

After the death of Jovian, Valentinian was chosen emperor. Immediately on his accession, the soldiers mutinied, and with great clamour required him to choose a partner in the sovereignty. Though he did not instantly comply with their demand, yet in a few days he chose his brother Valens for his partner; and, as the empire was threatened on all sides with an invasion of the barbarous nations, he thought proper to divide it. This famous partition was made at Mediana in Dacia; when Valens had for his share the whole of Asia, Egypt, and Thrace; and Valentinian all the West; that is, Illyricum, Italy, Gaul, Spain, Britain, and Africa.

71
Procopius revolts.

After this partition, Valens returned to Constantinople, where the beginning of his reign was disturbed by the revolt of Procopius, a relation of Julian. On the death of that emperor, he had fled into Taurica Chersonesus for fear of Jovian; but not trusting the barbarians who inhabited that country, he returned in disguise into the Roman territories, where having gained over an eunuch of great wealth, by name *Eugenius*, lately disgraced by Valens, and some officers who commanded the troops sent against the Goths, he got himself proclaimed emperor. At first he was joined only by the lowest of the people, but at length he was acknowledged by the whole city of Constantinople. On the news of this revolt, Valens would have abdicated the sovereignty, had he not been prevented by the importunities of his friends. He therefore dispatched some troops against the usurper; but these were gained over, and Procopius continued for some time to gain ground. It is probable he would finally have succeeded, had he not become so much elated with his good fortune, that he grew tyrannical and insupportable to his own party. In consequence of this alteration in his disposition, he was first abandoned by some of his principal officers; and soon after defeated in battle, taken prisoner, and put to death.

72
Is defeated and put to death.

73
War with the Goths.

This revolt produced a war betwixt Valens and the Goths. The latter, having been solicited by Pro-

copius, had sent 3000 men to his assistance. On hearing the news of the usurper's death, they marched back; but Valens detached against them a body of troops, who took them all prisoners notwithstanding the vigorous resistance they made. Athanaric, king of the Goths, expostulated on this proceeding with Valens; but that emperor proving obstinate, both parties prepared for war. In 367 and 369, Valens gained great advantages over his enemies; and obliged them to sue for peace, which was concluded upon terms very advantageous to the Romans. The rest of this reign contains nothing remarkable, except the cruelty with which Valens persecuted the orthodox clergy. The latter sent 80 of their number to him, in order to lay their complaints before him; but he, instead of giving them any relief, determined to put them all to death. But the person who was ordered to execute this sentence, fearing lest the public execution of so many ecclesiastics might raise disturbances, ordered them all to be put on board a ship, pretending that the emperor had ordered them only to be sent into banishment; but when the vessel was at some distance from land, the mariners set fire to it, and made their own escape in the boat. The ship was driven by a strong wind into an harbour, where it was consumed and all that were in it. A persecution was also commenced against magicians, or those who had books of magic in their custody. This occasioned the destruction of many innocent persons; for books of this kind were often conveyed into libraries unknown to the owners of them, and this was certainly followed by death and confiscation of goods. Hereupon persons of all ranks were seized with such terror that they burnt their libraries, lest books of magic should have been secretly conveyed in amongst the others. In 378, the Goths, whom Valens had admitted into Thrace, advanced from that province to Macedonia and Thessaly, where they committed dreadful ravages. They afterwards blocked up the city of Constantinople, plundered the suburbs, and at last totally defeated and killed the emperor himself. The day after the battle, hearing that an immense treasure was lodged in Adrianople, the barbarians laid siege to that place: but being quite strangers to the art of besieging towns, they were repulsed with great slaughter; upon which they dropped that enterprise, and returned before Constantinople. But here great numbers of them were cut in pieces by the Saracens, whom Maria their queen had sent to the assistance of the Romans; so that they were obliged to abandon this design likewise, and retire from the neighbourhood of that city.

Constantinopolitan history.

74
Eighty orthodox clergy ecclesiastics put to death.

75
Magicians persecuted.

76
Valens defeated and killed by the Goths.

By the death of Valens, the empire once more fell into the hands of a single person. This was Gratian, who had held the empire of the West after the death of Valentinian. He repulsed many barbarous nations who threatened the empire at that time with dissolution; but finding himself pressed on all sides, he soon resolved to take a colleague, in order to ease him of some part of the burden. Accordingly, on the 19th of January 379, he declared Theodosius his partner in the empire, and committed to his care all the provinces which had been governed by Valens.

77
Gratian takes Theodosius for his partner.

Theodosius is greatly extolled by the historians of those ages on account of his extraordinary valour and piety; and for these qualifications has been honoured

with

Constantinopolitan history.

78
Miserable state of the empire on his accession.

with the surname of *the Great*. From the many persecuting laws, however, made in his time, it would seem that his piety was at least very much misguided; and that if he was naturally of a humane and compassionate disposition, superstition and passion had often totally obscured it. He certainly was a man of great conduct and experience in war; and indeed the present state of the empire called for an exertion of all his abilities. The provinces of Dacia, Thrace, and Illyricum, were already lost; the Goths, Taifali, Alans, and Hunns, were masters of the greatest part of these provinces, and had ravaged and laid waste the rest. The Iberians, Armenians, and Persians, were likewise up in arms, and ready to take advantage of the distracted state of the empire. The few soldiers, who had survived the late defeat, kept within the strong holds of Thrace, without daring so much as to look abroad, much less face the victorious enemy, who moved about the country in great bodies. But notwithstanding this critical situation, the historians of those times give us no account of the transactions of the year 379. Many great battles indeed are said to have been fought, and as many victories obtained by Theodosius; but the accounts of these are so confused and contradictory, that no stress can be laid upon them.

In the month of February 380, Theodosius was seized with a dangerous malady, so that Gratian found himself obliged to carry on the war alone. This emperor, apprehending that the neighbouring barbarians might break into some of the provinces, concluded a peace with the Goths, which was confirmed by Theodosius on his recovery. The treaty was very advantageous to the barbarians; but they disregarding all their engagements, no sooner heard that Gratian had left Illyricum, than they passed the Danube, and breaking into Thrace and Pannonia, advanced as far as Macedon, destroying all with fire and sword. Theodosius, however, drawing together his forces, marched against them; and, according to the most respectable authorities, gained a complete victory; though Zosimus relates, that he was utterly defeated.

The following year, Athanaric, the most powerful of all the Gothic princes, being driven out by a faction at home, recurred to Theodosius, by whom he was received with great tokens of friendship. The emperor himself went out to meet him, and attended him with his numerous retinue into the city. The Gothic prince died the same year; and Theodosius caused him to be buried after the Roman manner with such pomp and solemnity, that the Goths, who attended him in his flight, returned home with a resolution never to molest the Romans any more. Nay, out of gratitude to the emperor, they took upon them to guard the banks of the Danube, and prevent the empire from being invaded on that side.

In 383, one Maximus revolted again Gratian in Britain; and in the end, having got the unhappy emperor into his power, caused him to be put to death, and assumed the empire of the West himself. Gratian had divided his dominions with his brother Valentinian, whom he allowed to reign in Italy and West Illyricum, reserving the rest to himself. Maximus therefore, immediately after his usurpation, sent deputies to Theodosius, assuring him that he had no de-

signs on the dominions of Valentinian. As Theodosius at that time found himself in danger from the barbarians, he not only forbore to attack Maximus after this declaration, but even acknowledged him for his partner in the empire. It was not long, however, before the ambition of the usurper prompted him to break his promise. In 387, he passed the Alps on a sudden; and meeting with no opposition, marched to Milan where Valentinian usually resided. The young prince fled first to Aquileia; and from thence to Thessalonica, to implore the protection of Theodosius. The latter, in answer to Valentinian's letter, informed him, that he was not at all surprised at the progress Maximus had made, because the usurper had protected, and Valentinian had persecuted, the orthodox Christians. At last he prevailed on the young prince to renounce the Arian heresy which he had hitherto maintained; after which Theodosius promised to assist him with all the forces of the East. At first, however, he sent messengers to Maximus, earnestly exhorting him to restore the provinces he had taken from Valentinian, and content himself with Gaul, Spain, and Britain. But the usurper would hearken to no terms. This very year he besieged and took Aquileia, Quaderna, Bononia, Mutina, Rhegium, Placentia, and many other cities in Italy. The following year he was acknowledged in Rome, and in all the provinces of Africa. Theodosius, therefore, finding a war inevitable, spent the remaining months of this and the beginning of the following year in making the necessary preparations. His army consisted chiefly of Goths, Huns, Alans, and other barbarians, whom he was glad to take into the service in order to prevent their raising disturbances on the frontiers. He defeated Maximus in two battles, took him prisoner, and put him to death. The usurper had left his son Victor, whom he created Augustus, in Gaul, to awe the inhabitants in his absence. Against him the emperor dispatched Arbogastes, who took him prisoner after having dispersed the troops that attended him, and put him to death. The victory was used afterwards by Theodosius with great clemency and moderation.

In 389, Theodosius took a journey to Rome; and, according to Prudentius, at this time converted the senate and people from idolatry to Christianity. The next year was remarkable for the destruction of the celebrated temple of Serapis in Alexandria; which, according to the description of Ammianus Marcellinus, surpassed all others in the world, that of Jupiter Capitolinus alone excepted. The reason of its being now destroyed was as follows. Theophilus, bishop of Alexandria, having begged and obtained of the emperor an old temple, formerly consecrated to Bacchus, but then ruined and forsaken, with a design to convert it into a church, the workmen found among the rubbish several obscene figures, which the bishop, to ridicule the superstition of the Heathens, caused to be exposed to public view. This provoked the Pagans to such a degree, that they flew to arms; and falling unexpectedly upon the Christians, cut great numbers of them in pieces. The latter, however, soon took arms in their own defence; and being supported by the few soldiers who were quartered in the city, began to repel force by force. Thus a civil war was kindled, and no day passed without some encounter. The Pa-

Constantinopolitan history.

81
Who invades the dominions of Valentinian.

82
His success.

83
Defeated and put to death by Theodosius.

84
The temples in Alexandria, and throughout all Egypt, destroyed.

79
The Goths defeated by Theodosius.

80
Gratian murdered by Maximus.

Constantinopolitan history.

gans used to retire to the temple of Serapis; and thence sallying out unexpectedly seized on such Christians as they met, and, dragging them into the temple, either forced them by the most exquisite torments to sacrifice to their idol, or, if they refused, racked them to death. As soon as they expected to be attacked by the emperor's troops, they chose a philosopher named *Olympus* for their leader, with a design to defend themselves to the last extremity. The emperor, however, would not suffer any punishment to be inflicted upon them for the lives of those they had taken away, but readily forgave them; however, he ordered all the temples of Alexandria to be immediately pulled down, and commanded the bishop to see his orders put in execution. The Pagans no sooner heard that the emperor was acquainted with their proceedings than they abandoned the temple, which was in a short time destroyed by Theophilus; nothing being left except the foundations, which could not be removed on account of the extraordinary weight and size of the stones. Not satisfied with the destruction of the Alexandrian temples, the zealous bishop encouraged the people to pull down all the other temples, oratories, chapels, and places set apart for the worship of the Heathen gods throughout Egypt, and the statues of the gods themselves to be either burnt or melted down. Of the innumerable statues which at that time were to be found in Egypt, he is said to have spared but one, viz. that of an ape, in order to expose the Pagan religion to ridicule. On his return to Constantinople, Theodosius ordered such temples as were yet standing to be thrown down, and the Arians to be every where driven out of the cities.

85 In 392, Valentinian, emperor of the West, was treacherously murdered by Arbogastes his general; who, though he might afterwards have easily seized on the sovereignty himself, chose to confer it upon one Eugenius, and to reign in his name. This new usurper, though a Christian, was greatly favoured by the Pagans, who were well apprized that he only bore the title of emperor, while the whole power lodged in Arbogastes, who pretended to be greatly attached to their religion. The aruspices began to appear anew, and informed him that he was destined to the empire of the whole world; that he would soon gain a complete victory over Theodosius, who was as much hated as Eugenius was beloved by the gods, &c. But though Eugenius seemed to favour the Pagans, yet in the very beginning of his reign he wrote to St Ambrose. The holy man did not answer his letter till he was pressed by some friends to recommend them to the new prince; and then he wrote to this infamous usurper with all the respect due to an emperor. Soon after his accession to the empire, Eugenius sent deputies to Theodosius; and they are said to have been received by him in a very obliging manner. He did not, however, intend to enter into any alliance with this usurper, but immediately began his military preparations. In 394, he set out from Constantinople, and was at Adrianople on the 15th of June that year. He bent his march through Dacia, and the other provinces between Thrace and the Julian Alps, with a design to force the passes of these mountains, and break into Italy before the army of Eugenius was in a condition to oppose him. On his arrival at the Alps, he

found these passes guarded by Flavianus prefect of Italy, at the head of a considerable body of Roman troops. These were utterly defeated by Theodosius, who thereupon crossed the Alps and advanced into Italy. He was soon met by Eugenius; and a bloody battle ensued, without any decisive advantage on either side. The next day the emperor led his troops in person against the enemy, utterly defeated them, and took their camp. Eugenius was taken prisoner by his own men, and brought to Theodosius, who reproached him with the murder of Valentinian, with the calamities he had brought on the empire by his unjust usurpation, and with putting his confidence in Hercules, and not in the true God; for on his chief standard he had displayed the image of that fabulous hero. Eugenius begged earnestly for his life; but while he lay prostrate at the emperor's feet, his own soldiers cut off his head, and carrying it about on the point of a spear, showed it to those in the camp, who had not yet submitted to Theodosius. At this they were all thunderstruck; but being informed that Theodosius was ready to receive them into favour, they threw down their arms and submitted. After this, Arbogastes, despairing of pardon, fled to the mountains; but being informed that diligent search was made for him, he laid violent hands on himself. His children, and those of Eugenius, took sanctuary in churches; but the emperor not only pardoned, but took the opportunity of converting them to Christianity, restored to them their paternal estates, and raised them to considerable employments in the state. Soon after this, Theodosius appointed his son Honorius emperor of the West, assigning him for his share Italy, Gaul, Spain, Africa, and West Illyricum. The next year, as he prepared for his return to Constantinople, he was seized with a dropsy, owing to the great fatigues he had undergone during the war. As soon as he perceived himself to be in danger, he made his will; by which he bequeathed the empire of the East to Arcadius, and confirmed Honorius in the possession of the West. He likewise confirmed the pardon which he had granted to all those who had borne arms against him, and remitted a tribute which had proved very burdensome to the people; and charged his two sons to see these points of his will executed. He died at Milan on the 17th of January 395, in the 16th of his reign and 50th of his age.

86 From the time of Theodosius to the time when the Roman empire in the West was totally destroyed by the Goths, we find but very little remarkable in the history of Constantinople. At this time the eastern empire was usurped by Basiliscus, who had driven out Zeno the lawful emperor; being assisted in his conspiracy by the empress Verina his sister. Zeno fled into Isauria, whither he was pursued by Illus and Trecondes, two of the usurper's generals; who having easily defeated the few troops he had with him, forced the unhappy prince to shut himself up in a castle, which they immediately invested. But in a short time Basiliscus having disobliterated the people by his cruelty, avarice, and other bad qualities, for which he was no less remarkable than his predecessor had been, his generals joined with Zeno, whom they restored to the throne. After his restoration, Zeno having got Basiliscus into his power, confined him in a castle of Cappadocia together with his wife Zenonides, where they both perished.

Constantinopolitan history.

86 Eugenius defeated, taken prisoner, and put to death.

87 Arbogastes lays violent hands on himself.

88 Theodosius dies.

89 Empire usurped by Basiliscus.

Constantinopolitan history.

90
Is starved to death.

91
Great fire at Constantinople.

perished with hunger and cold. This happened in the year 467, after Basiliscus had reigned about 20 months. During the time of this usurpation a dreadful fire happened at Constantinople, which consumed great part of the city, with the library containing 120,000 volumes; among which were the works of Homer, written, as is said, on the great gut of a dragon 120 feet long.

The misfortunes which Zeno had undergone did not work any reformation upon him. He still continued the same vicious courses which had given occasion to the usurpation of Basiliscus. Other conspiracies were formed against him, but he had the good fortune to escape them. He engaged in a war with the Ostrogoths, in which he proved unsuccessful, and was obliged to yield the provinces of Lower Dacia and Mœsia to them. In a short time, however, Theodoric their king made an irruption into Thrace, and advanced within 15 miles of Constantinople, with a design to besiege that capital: but the following year, 485, they retired in order to attack Odoacer king of Italy; of which country Theodoric was proclaimed king in 493. The emperor Zeno died in the year 491, in the 65th year of his age, and 17th of his reign.

92
Decline of the Roman empire, to what owing.

The Roman empire had now for a long time been on the decline: the ancient valour and military discipline which had for such a long time rendered the Romans superior to other nations, had greatly degenerated; so that they were now by no means so powerful as formerly. The tumults and disorders which had happened in the empire from time to time by the many usurpations, had contributed also to weaken it very much. But what proved of the greatest detriment was the allowing vast swarms of barbarians to settle in the different provinces, and to serve in the Roman empire in separate and independent bodies. This had proved the immediate cause of the dissolution of the western empire; but as it affected the eastern parts less, the Constantinopolitan empire continued for upwards of 900 years after the western one was totally dissolved. The weak and imprudent administration of Zeno, and Anastasius who succeeded him, had reduced the eastern empire still more; and it might possibly have expired in a short time after the western one, had not the wise and vigorous conduct of Justin, and his partner Justinian, revived in some measure the ancient martial spirit which had originally raised the Roman empire to its highest pitch of grandeur.

93
It revives under Justin and Justinian.

Justin ascended the throne in 518. In 521 he engaged in a war with the Persians, who had all along been very formidable enemies to the Roman name. Against them he employed the famous Belisarius; but of him we hear nothing remarkable till after the accession of Justinian. This prince was the nephew of Justin, and was by him taken as his partner in the empire in 527; and the same year Justin died, in the 77th year of his age and 9th of his reign. Justinian being now sole master of the empire, bent his whole force against the Persians. The latter proved successful in the first engagement; but were soon after utterly defeated by Belisarius on the frontiers of Persia, and likewise by another general named *Dorotheus* in Armenia. The war continued with various success during the first five years of Justinian's reign. In the sixth year a peace was concluded upon the following

94
Justinian's war with the Persians.

terms: 1. That the Roman emperor should pay to Cosroes, the king of Persia, 1000 pounds weight of gold. 2. That both princes should restore the places they had taken during the wars. 3. That the commander of the Roman forces should no longer reside at Daras on the Persian frontiers, but at a place called *Constantina* in Mesopotamia, as he had formerly done. 4. That the Iberians, who had sided with the Romans, should be at liberty to return to their own country or stay at Constantinople. This peace, concluded in 532, was styled *eternal*; but in the event proved of very short duration.

Constantinopolitan history.

About this time happened at Constantinople the greatest tumult mentioned in history. It began among the different factions in the circus, but ended in an open rebellion. The multitude, highly dissatisfied with the conduct of John the *prefectus pratorio*, and of Trebonianus then questor, forced Hypatius, nephew to the emperor Anastasius, to accept the empire, and proclaimed him with great solemnity in the forum. As the two above-mentioned ministers were greatly abhorred by the populace on account of their avarice, Justinian immediately discharged them, hoping by that means to appease the tumult: but this was so far from answering the purpose, that the multitude only grew the more outrageous upon it; and most of the senators joining them, the emperor was so much alarmed, that he had thoughts of abandoning the city and making his escape by sea. In this dilemma the empress Theodora encouraged and persuaded him rather to part with his life than the kingdom; and he at last resolved to defend himself to the utmost, with the few senators who had not yet abandoned him. In the mean time, the rebels having attempted in vain to force the gates of the palace, carried Hypatius in triumph to the circus; where, while he was beholding the sports from the imperial throne, amidst the shouts and acclamations of the people, Belisarius, who had been recalled from Persia, entered the city with a considerable body of troops. Being then apprised of the usurpation of Hypatius, he marched straight to the circus; fell sword in hand upon the disarmed multitude; and with the assistance of a band of Heruli, headed by Mundus governor of Illyricum, cut about 30,000 of them in pieces. Hypatius the usurper, and Pompeius another of the nephews of Anastasius, were taken prisoners and carried to the emperor, by whose orders they were both beheaded, and their bodies cast into the sea. Their estates were confiscated, and likewise the estates of such senators as had joined with them; but the emperor caused great part of their lands and effects to be afterwards restored, together with their honours and dignities, to their children.

95
Great tumult in Constantinople.

Justinian having now no other enemy to contend with, turned his arms against the Vandals in Africa, and the Goths in Italy; both which provinces he recovered out of the hands of the barbarians*. But before his general Belisarius had time to establish fully the Roman power in Italy, he was recalled in order to carry on the war against Cosroes king of Persia, who, in defiance of the treaty formerly concluded in 532, entered the Roman dominions at the head of a powerful army. The same year, however, a peace was concluded between the two nations upon the following conditions: 1. That the Romans should, with-

* See *Barbary and Goths*.
96
Another war with the Persians.

Constantinopolitan history.

in two months, pay to the Persian king 5000 pounds weight of gold, and an annual pension of 500. 2. That the Persians should relinquish all claim to the fortresses of Daras, and maintain a body of troops to guard the Caspian gates, and prevent the barbarians from breaking into the empire. 3. That upon payment of the above-mentioned sum, Cosroes should immediately withdraw his troops from the Roman dominions. The treaty being signed, and the stipulated sum paid, Cosroes began to march back again; but by the way plundered several cities as if the war had still continued. Hereupon Justinian resolved to pursue the war with the utmost vigour; and for that purpose dispatched Belisarius into the east. But soon after he was obliged to recall him in order to oppose the Goths who had gained great advantages in Italy after his departure. The Persian war was then carried on with indifferent success till the year 558, when a peace was concluded upon the emperor again paying an immense sum to the enemy. The same year the Huns, passing the Danube in the depth of winter, marched in two bodies directly for Constantinople; and laying waste the countries through which they passed, came, without meeting the least opposition, within 150 furlongs of the city. But Belisarius marching out against them with an handful of men, put them to flight; the emperor, however, to prevent them from invading the empire anew, agreed to pay them an annual tribute, upon their promising to defend the empire against all other barbarians, and to serve in the Roman armies when required. This was the last exploit performed by Belisarius, who on his return to Constantinople was disgraced, stripped of all his employments, and confined to his house, on pretence of a conspiracy against the emperor. *. In the year 565 a real conspiracy was formed against Justinian, which he happily escaped, and the conspirators were executed; but the emperor did not long survive it, being carried off by a natural death in 566, in the 39th year of his reign.

* See Belisarius.

98 Decline of the empire after Justinian.

† See Arabia.

During the reign of Justinian, the majesty of the Roman empire seemed to revive. He recovered the provinces of Italy and Africa out of the hands of the barbarians, by whom they had been held for a number of years; but after his death they were soon lost, and the empire tended fast to dissolution. In 569 Italy was conquered by the Lombards, who held it for the space of 200 years. Some amends, however, was made for the loss by the acquisition of *Perfarmeria*; the inhabitants of which, being persecuted by the Persians on account of the Christian religion which they professed, revolted to the Romans. This produced a war between the two nations, who continued to weaken each other, till at last the Persian monarchy was utterly overthrown, and that of the Romans greatly reduced by the Saracens†. These new enemies attacked the Romans in the year 632, and pursued their conquests with incredible rapidity. In the space of four years they reduced the provinces of Egypt, Syria, and Palestine. In 648 they were also masters of Mesopotamia, Phœnicia, Africa, Cyprus, Aradus, and Rhodes; and having defeated the Roman fleet, commanded by the emperor Constantine in person, they concluded a peace on condition of keeping the vast extent of territory they had seized, and paying for it 1000 nummi a-year.

An expedition against the Lombards was about this time undertaken, but with very little success, a body of 20,000 Romans being almost entirely cut off by one of the Lombard generals. In 671 the Saracens ravaged several provinces, made a descent in Sicily, took and plundered the city of Syracuse, and over-ran the whole island, destroying every thing with fire and sword. In like manner they laid waste Cilicia; and having passed the winter at Smyrna, they entered Thrace in the winter of the year 672, and laid siege to Constantinople itself. Here, however, they were repulsed with great loss: but next spring they renewed their attempt, in which they met with the same bad success; many of their ships being burnt by the *sea-fire*, as it was called, because it burnt under water: and in their return home their fleet was wrecked off the Scyllæan promontory. At last a peace was concluded for 30 years, on condition that the Saracens should retain all the provinces they had seized; and that they should pay to the emperor and his successors 3000 pounds weight of gold, 50 slaves, and as many choice horses.

This peace was scarce concluded, when the empire was invaded by a new enemy, who proved very troublesome for a long time. These were the Bulgarians; who breaking into Thrace, defeated the Roman army sent against them, and ravaged the country far and wide. The emperor consented to pay them an annual pension, rather than continue a doubtful war; and allowed them to settle in Lower Mœsia, which from them was afterwards called *Bulgaria*. In 687, they were attacked by Justinian II. who entered their country without provocation, or regarding the treaties formerly concluded with them. But they falling suddenly upon him, drove him out of their country, and obliged him to restore the towns and captives he had taken. In 697, this emperor was deposed; and in his exile fled to Trebelis king of the Bulgarians, by whom he was kindly entertained, and by whose means he was restored to his throne; but soon forgetting this favour, he invaded the country of the Bulgarians, with a design to wrest from them those provinces which he had yielded to them. He was attended in this expedition by no better success than his ingratitude deserved, his army being utterly defeated, and he himself obliged to make his escape in a light vessel to Constantinople. The Bulgarians continued their inroads and ravages at different times, generally defeated the Romans who ventured to oppose them, till the year 800, the seventh of the reign of Nicephorus, when they surprised the city of Sardica in Mœsia, and put the whole garrison, consisting of 6000 men, to the sword. The emperor marched against them with a considerable army: but the enemy retired at his approach; and he, instead of pursuing them, returned to Constantinople. Two years after, he entered Bulgaria at the head of a powerful army, destroying every thing with fire and sword. The king offered to conclude a peace with him upon honourable terms; but Nicephorus, rejecting his proposals, continued to waste the country, destroying the cities, and putting all the inhabitants, without distinction of sex or age, to the sword. The king was so much affected with these cruelties which were exercised on his subjects, that he sent a second embassy to Nicephorus, offering to conclude

Constantinopolitan history.

99 Unsuccessful expedition against the Lombards.

100 Constantinople besieged by the Saracens.

101 Empire invaded by the Bulgarians.

102 They defeated Justinian II.

103 Their country cruelly ravaged by Nicephorus.

Constantinopolitan history

104 Who is cut off with his whole army.

105 Their country invaded by Basilus II.

166 His monstrous cruelty.

107 The country subdued.

a peace with him upon any terms, provided he would quit his country. But Nicephorus dismissing the ambassadors with scorn, the Bulgarian monarch attacked unexpectedly the Roman camp, forced it, and cut off almost the whole army, with the emperor himself, and a great number of patricians. His successor Michael likewise engaged in a war with the Bulgarians; but being utterly defeated, he was so grieved that he resigned the empire. After this the Bulgarians continued to be very formidable enemies to the empire, till the year 979, when they were attacked by Basilus II. The Bulgarians were at that time governed by a king named *Samuel*; who having ravaged the Roman territories, as was the common practice of his nation, Basilus sent against him one Nicephorus Uranus at the head of a powerful army. Uranus, leaving his baggage at Larissa, reached by long marches the Sperchius, and encamped with his whole army over against the enemy, who lay on the opposite bank. As the river was greatly swelled with the heavy rains that had lately fallen, Samuel, not imagining the Romans would attempt to pass it, suffered his troops to roam in large parties about the country in quest of booty. But Uranus having at length found out a place where the river was fordable, passed it in the dead of the night without being perceived. He then fell upon the Bulgarians who were left in the camp, and lay for the most part asleep; cut great numbers of them in pieces; took a great number of prisoners, with all their baggage; and made himself master of their camp. Samuel and his son were dangerously wounded; and would have been taken, had they not all that day concealed themselves among the dead. The next night they stole away to the mountains of *Ætola*, and from thence made their escape into Bulgaria. The following year the emperor entered Bulgaria at the head of a numerous and well-disciplined army; defeated Samuel in a pitched battle, and took several strong cities. The emperor himself, however, at last, narrowly escaped being cut off with his whole army; being unexpectedly attacked by the Bulgarians in a narrow pass. From this danger he was relieved by the arrival of Nicephorus Xiphias, governor of Philpopolis, with a considerable body of troops; who falling upon the enemies rear, put them to flight. Basilus pursued them close; and having taken an incredible number of captives, caused their eyes to be pulled out, leaving to every hundred a guide with one eye, that he might conduct them to Samuel. This shocking spectacle so affected the unhappy king, that he fell into a deep swoon, and died two days after. The Roman emperor pursued his conquests, and in the space of two years made himself master of most of the enemies strong holds. He defeated also the successor of Samuel in several engagements; and having at last killed him in battle, the Bulgarians submitted themselves without reserve. The vast treasures of their princes were by Basilus distributed among his soldiers by way of donative. Soon after, the widow of the late king, with her six daughters and three of her sons, surrendered themselves to the Roman emperor, by whom they were received with the utmost civility and respect. This obliging behaviour encouraged the three other sons of the late king, and most of the

princes of the blood, who had taken shelter in the mountains, to submit, and throw themselves on the emperor's mercy.

Ibatzes, however, a person nearly allied to the royal family, who had distinguished himself in a very eminent manner during the whole course of the war, refused to submit, and fled to a steep and craggy mountain, with a design to defend himself there to the last extremity. Basilus endeavoured to cause him submit by fair means, but he equally despised both threats and promises. At last Eustathius Daphnomelus, whom Basilus had lately appointed governor of Achridus, the chief city of Bulgaria, undertook to secure him by a most desperate and improbable scheme. Without communicating his design to any, he repaired, with two persons in whom he could confide, to the mountain on which Ibatzes had fortified himself. He hoped to pass undiscovered among the many strangers who flocked thither to celebrate the approaching feast of the Virgin Mary, for whom Ibatzes had a particular veneration. In this he found himself mistaken; for he was known by the guards, and carried before the prince. To him he pretended to have something of importance to communicate; but as soon as Ibatzes had retired with him into a remote place, Daphnomelus threw himself suddenly upon him, and with the assistance of the two men whom he had brought with him, pulled out both his eyes, and got safe to an abandoned castle on the top of the hill. Here they were immediately surrounded by the troops of Ibatzes; but Daphnomelus exhorting them now to submit to the emperor, by whom he assured them they would be well received, they congratulated Daphnomelus on his success, and suffered him to conduct the unhappy Ibatzes a prisoner to Basilus. The emperor was no less surprised than pleased at the success of this bold attempt; and rewarded Daphnomelus with the government of Dyrrhachium, and all the rich moveables of his prisoner. After this, having accomplished the entire reduction of Bulgaria, he returned to Constantinople with an incredible number of captives; where he was received by the senate and people with all possible demonstrations of joy.

All this time the Saracens had at intervals invaded the Roman dominions, and even attempted to make themselves masters of Constantinople. Their internal divisions, however, rendered them now much less formidable enemies than they had formerly been; so that some provinces were even recovered for a time out of their hands; though the weak and distracted state of the empire rendered it impossible to preserve such conquests. But in 1041, the empire was invaded by an enemy, not very powerful at that time indeed, but who by degrees gathered strength sufficient to overthrow both the Roman and Saracen empires. These were the Turks; who having quitted their ancient habitations in the neighbourhood of mount Caucasus, and passed the Caspian straits, settled in Armenia Major, about the year 844. There they continued an unknown and despicable people, till the intestine wars of the Saracens gave them an opportunity of aggrandizing themselves. About the year 1030, Mohammed the son of Sambrael sultan of Persia, not finding himself a match for Pifariss sultan of Babylon, with whom he was at war, had

Constantinopolitan history

108 Ibatzes alone holds out.

109 He is taken by a stratagem.

110 The empire invaded by the Turks.

111 Account of them.

Constantinopolitan history.

recourse to the Turks, who sent him 3000 men under the command of one Tangrolipix, a leading man among them. By their assistance Mohammed defeated his adversary; but when the Turks desired leave to return home, he refused to part with them. Upon this they withdrew without his consent to a neighbouring desert; and being there joined by several discontented Persians, began to make frequent inroads into the sultan's territories. Against them Mohammed immediately dispatched an army of 20,000 men; who, being surprised in the night, were utterly defeated by Tangrolipix. The fame of this victory drew multitudes to him from all parts; so that in a short time Tangrolipix saw himself at the head of 50,000 men. Upon this Mohammed marched against them in person, but was thrown from his horse in the beginning of the engagement, and killed by the fall; upon which his men threw down their arms, and submitted to Tangrolipix.

112 They defeat the Romans.

After this victory the Turkish general made war upon the sultan of Babylon: whom he at length slew, and annexed his dominions to his own. He then sent his nephew, named *Cutlu-Moses*, against the Arabians; but by them he was defeated, and forced to fly towards Media. Through this province he was denied a passage by Stephen the Roman governor; upon which Cutlu-Moses was obliged to force a passage by encountering the Roman army. These he put to flight, took the governor himself prisoner, and without any further opposition reached the confines of Persia, where he sold Stephen for a slave. Returning from thence to Tangrolipix, he excused, in the best manner he could, his defeat by the Arabians; but at the same time acquainted him with his victory over the Romans in Media, encouraging him to invade that fertile country, which he said might be easily conquered, as it was inhabited by none but *women*, meaning the Romans. At that time Tangrolipix did not hearken to his advice, but marched against the Arabians at the head of a numerous army. He was, however, attended with no better success than his nephew had been; and therefore began to reflect on what he had told him.

113 A Turkish army entirely cut off.

114 They again invade the empire.

Soon after he sent Asan his brother's son with an army of 20,000 men to reduce Media. Pursuant to his orders, the young prince entered that country, and committed every where dreadful ravages: but being in the end drawn into an ambush by the Roman generals, he was cut off with his whole army. Tangrolipix, no way discouraged by this misfortune, sent a new army into Media near 100,000 strong; who after having ravaged the country without opposition, laid siege to Artza a place of great trade, and therefore reckoned the most wealthy in those parts. Not being able to reduce it by any other means, they set it on fire; and thus in a short time it was utterly destroyed: the buildings being reduced to ashes, and 150,000 of the inhabitants perishing either by the flames or the sword. After this Abraham Halim, half brother to Tangrolipix, hearing that the Romans, reinforced with a body of troops under the command of Liparites governor of Iberia, had taken the field, marched against them, and offered them battle; which they not declining, the two armies engaged with incredible fury. The victory continued long doubtful; but at length inclined to the Romans; who nevertheless did not think pro-

115 An obstinate engagement.

per to pursue the fugitives, as their general Liparites was taken prisoner. The emperor, greatly concerned for the captivity of Liparites, dispatched ambassadors with rich presents, and a large sum of money to redeem him, and at the same time to conclude an alliance with Tangrolipix. The sultan received the presents; but generously returned them together with the money to Liparites, whom he set at liberty without any ransom: only requiring him, at his departure, never more to bear arms against the Turks. Not long after, Tangrolipix sent a person of great authority among the Turks, with the character of ambassador, to Constantinople; who having arrogantly exhorted the emperor to submit to his master, and acknowledge himself his tributary, was ignominiously driven out of the city.

Tangrolipix, highly affronted at the reception his ambassador had met with, entered Iberia while the emperor Constantine Monomachus was engaged in a war with the Patzinacæ, a Scythian nation. Having ravaged that country, he returned from thence to Media, and laid siege to Mantzichiarta, a place defended by a numerous garrison, and fortified with a triple wall and deep ditches. However, as it was situated in an open plain country, he hoped to be master of it in a short time. But finding the besieged determined to defend themselves to the last extremity, he resolved to raise the siege, after he had continued it 30 days. One of his officers, however, named *Alcan*, prevailed on him to continue it but one day longer, and to commit the management of the attacks to him. This being granted, Alcan disposed his men with such skill, and so encouraged them by his example, that, notwithstanding the vigorous opposition they met with, the place would have probably been taken, had not Alcan been slain as he was mounting the wall. The besieged, knowing him by the richness of his armour, drew him by the hair into the city, and cutting off his head threw it over the wall among the enemy: which so disheartened them, that they gave over the assault and retired. The next spring Tangrolipix returned, and ravaged Iberia with the utmost cruelty, sparing neither sex nor age. But on the approach of the Roman army he retired to Tauris leaving 30,000 men behind him to infest the frontiers of the empire. This they did with great success, the borders being through the avarice of Monomachus unguarded. Till the time of this emperor, the provinces bordering on the countries of the barbarians had maintained, at their own charge, forces to defend them; and were on that account exempted from paying tribute: but as Monomachus exacted from them the same sums that were paid by others, they were no longer in a condition to defend themselves.

In 1063 died the emperor Constantine Ducas, having left the empire to his three sons, Michael, Andronicus, and Constantine: but as they were all very young, he appointed the empress Eudocia regent during their minority, after having required of her an oath never to marry; which oath was with great solemnity lodged in the hands of the patriarch. He likewise obliged the senators solemnly to swear that they would acknowledge none for their sovereign but his three sons. No sooner, however, was he dead, than the Turks, hearing that the empire was governed by

Constantinopolitan history.

116 The Turks besiege Mantzichiarta.

117 The siege raised.

118 The empress Eudocia forced to swear that she will never marry.

Constantinopolitan history.

a woman, broke into Mesopotamia, Cilicia, and Cappadocia, destroying all with fire and sword. The empress was no way in a condition to oppose them, the greater part of the army having been disbanded in her husband's life-time, and the troops that were still on foot being undisciplined, and altogether unfit for service. The concern which this gave the empress was aggravated by the seditious speeches of a discontented party at home, who repeated on all occasions that the present state of affairs required a man of courage and address at the helm, instead of a weak and helpless woman; and as they imagined the empress would never think of marrying, in consequence of the oath she had taken, they hoped by these speeches to induce the people to revolt, and choose a new emperor. This Eudocia was aware of; and therefore determined to prevent the evils that threatened herself and her family, by marrying some person of merit who was capable of defeating her enemies both at home and abroad. At this time one Romanus Diogenes, a person of a most beautiful aspect, extraordinary parts, and illustrious birth, being accused of aspiring to the empire, tried and convicted, was brought forth to receive sentence of death. But the empress, touched with compassion at his appearance, gently upbraided him with his ambition, set him at liberty, and soon after appointed him commander in chief of all her forces. In this station he acquitted himself so well, that the empress resolved to marry him if she could but recover the writing in which her oath was contained out of the hands of the patriarch. In order to this, she applied to a favourite eunuch; who going to the patriarch, told him, that the empress was so taken with his nephew named Bardas, that she was determined to marry and raise him to the empire, provided the patriarch absolved her from the oath she had taken, and convinced the senate of the lawfulness of her marriage. The patriarch, dazzled with the prospect of his nephew's promotion, readily undertook to perform both. He first obtained the consent of the senate by representing to them the dangerous state of the empire, and exclaiming against the rash oath which the jealousy of the late emperor had extorted from the empress. He then publicly discharged her from it; restored the writing to her; and exhorted her to marry some deserving object, who being entrusted with an absolute authority, might be capable of defending the empire. The empress, thus discharged from her oath, married a few days after Romanus Diogenes; who was thereupon proclaimed emperor, to the great disappointment of the patriarch.

As the new emperor was a man of great activity and experience in war, he no sooner saw himself vested with the sovereign power, than he took upon him the command of the army, and passed over into Asia with the few forces he could assemble, recruiting and inuring them on his march to military discipline, which had been utterly neglected in the preceding reigns. On his arrival in this continent, he was informed that the Turks had surprised and plundered the city of Neocaesarea, and were retiring with their booty. On this news he hastened after them at the head of a chosen body of light armed troops, and came up with them on the third day. As the Turks were marching in disorder, without the least apprehension of an enemy,

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Romanus cut great numbers of them in pieces, and easily recovered the booty; after which he pursued his march to Aleppo, which he retook from them, together with Hierapolis, where he built a strong castle.

As he was returning to join the forces he had left behind him, he was met by a numerous body of Turks, who attempted to cut off his retreat. At first he pretended to decline an engagement through fear; but attacked them afterwards with such vigour when they least expected it, that he put them to flight at the first onset, and might have gained a complete victory had he thought proper to pursue them. After this, several towns submitted to him; but the season being now far spent, the emperor returned to Constantinople. The following year he passed over into Asia early in the spring; and being informed that the Turks had sacked the rich city of Iconium, besides gaining other considerable advantages, he marched in person against them. But the Turks, not thinking it advisable to wait his coming, retired in great haste. The Armenians, however, encouraged by the approach of the emperor's army, fell upon the enemy in the plains of Tarsus, put them to flight, and stripped them both of their baggage and the booty they had taken. The spring following the emperor once more entered Asia at the head of a considerable army which he had raised, and with incredible pains disciplined during the winter. When the two armies drew near to each other, Axan, the Turkish sultan, and son of the famous Tangrolipix, sent proposals to Romanus for a lasting and honourable peace. These were imprudently rejected, and a desperate engagement ensued, when, in spite of the utmost efforts of the emperor, his army was routed, and he himself wounded and taken prisoner. When this news was brought to Axan, he could scarcely believe it; but being convinced by the appearance of the royal captive in his presence, he tenderly embraced him, and addressed him in an affectionate manner: "Grieve not (said he), most noble emperor, at your misfortune; for such is the chance of war, sometimes overwhelming one, and sometimes another: you shall have no occasion to complain of your captivity; for I will not use you as my prisoner, but as an emperor." The Turk was as good as his word. He lodged the emperor in a royal pavilion; assigned him attendants, with an equipage suitable to his quality; and discharged such prisoners as he desired. After he had for some days entertained his royal captive with extraordinary magnificence, a perpetual peace was concluded betwixt them, and the emperor dismissed with the greatest marks of honour imaginable. He then set out with the Turkish ambassador for Constantinople, where the peace was to be ratified; but by the way he was informed that Eudocia had been driven from the throne by John the brother of Constantine Ducas, and Piellus a leading man in the senate, who had confined her to a monastery, and proclaimed her eldest son, Michael Ducas, emperor. On this intelligence, Romanus retired to a strong castle near Theodosiopolis, where he hoped in a short time to be joined by great numbers of his friends and adherents. But in the mean time John, who had taken upon him to act as guardian to the young prince, dispatched Andronicus with a considerable army against him. Andronicus having easily de-

Constantinopolitan history.

124

Gains a second victory.

125

They are again defeated.

126

The Romans defeated and the emperor taken.

127

Eudocia deposed and confined in a monastery.

119 The empress determines to break her oath.

120 She recovers the writing in which it was contained,

121 And marries Romanus Diogenes.

122 He passes over into Asia.

123 He defeats the Turks.

Constantinopolitan history.

128
Romanus put to death.

129
The Turks again invaded the empire.
130
They defeat the Romans.

131
They gain a second victory.

132
They conquer several provinces.

feated the small army which Romanus had with him, obliged him to fly to Adana a city in Cilicia, where he was closely besieged, and at last obliged to surrender. Andronicus carried his prisoner into Phrygia, where he fell dangerously ill, being, as was suspected, secretly poisoned. But the poison being too slow in its operation, John ordered his eyes to be put out; which was done with such cruelty that he died soon after, in the year 1067, having reigned three years and eight months.

Axan was no sooner informed of the tragical end of his friend and ally, than he resolved to invade the empire anew; and that not with a design only to plunder as formerly, but to conquer, and keep what he had once conquered. The emperor dispatched against him Isaac Comnenus, with a considerable army; but he was utterly defeated and taken prisoner by Axan. Another army was quickly sent off under the command of John Ducas the emperor's uncle. He gained at first some advantages, and would probably have put a stop to their conquests, had not one Rufelius, or Urfelius, revolted with the troops he had under his command, caused himself to be proclaimed emperor, and reduced several cities in Phrygia and Cappadocia. Against him John marched with all his forces, suffering the Turks in the mean time to pursue their conquests; but coming to an engagement with the rebels, his army was entirely defeated, and himself taken prisoner. Notwithstanding this victory, Rufelius was so much alarmed at the progress of the Turks, that he not only released his prisoner, but joined with him against the common enemy, by whom they were both defeated and taken prisoners. Axan, however, was for some time prevented from pursuing his conquests by Cutlu-Moses, nephew to the late Tangrolipix. He had revolted against his uncle; but being defeated by him in a pitched battle, had taken refuge in Arabia, whence he now returned at the head of a considerable army, in order to dispute the sovereignty with Axan. But while the two armies were preparing to engage, the kalif of Babylon, who was still looked upon as the successor of the great prophet, interposed his authority. He represented the dangers of their intestine dissensions; and by his mediation, an agreement was at last concluded, on condition that Axan should enjoy undisturbed the monarchy lately left him by his father, and Cutlu-Moses should possess such provinces of the Roman empire as he or his sons should in process of time conquer.

After this agreement, both the Turkish princes turned their forces against the empire; and before the year 1077, made themselves masters of all Media, Lycaonia, Cappadocia, and Bithynia, fixing the capital city of their empire at Nice in the latter province. During all this time, the emperors of Constantinople, as well as their subjects, seemed to be in a manner infatuated. No notice was taken of the great progress made by these barbarians. The generals were ambitious only of seizing the tottering empire, which seemed ready to fall a prey to the Turks; and, after it was obtained, spent their time in oppressing their subjects, rather than in making any attempts to repulse the enemy.

At last Alexius Comnenus, having wrested the empire from Nicephoru Botoniates, in 1077, began to

prepare for opposing so formidable an enemy. But before he set out, as his soldiers had committed great outrages on his accession to the empire, he resolved to make confession of his sins, and do open penance for those he had suffered his army to commit. Accordingly he appeared in the attire of a penitent before the patriarch and several other ecclesiastics, acknowledged himself guilty of the many disorders that had been committed by his soldiers, and begged of the patriarch to impose upon him a penance suitable to the greatness of his crimes. The penance enjoined him and his adherents by the patriarch was to fast, lie upon the ground, and practise several other austerities for the space of 40 days. This command was religiously obeyed, and the emperor then began to prepare for war with so much vigour, that Solymán, the Turkish sultan, son and successor to Cutlu-Moses, dispatched ambassadors to Alexius with proposals of peace. These were at first rejected; but the emperor was at last glad to accept them on certain advice, that Robert Guiscard, duke of Puglia and Calabria, was making great preparations against him in the West.

To this expedition, Robert was incited by Michael Ducas. That prince had been deposed by Nicephoru Botoniates, and towards the end of the usurper's reign fled into the West, where he was received by Robert, who was prevailed upon to favour his cause. For this purpose, Robert made great preparations; and these were continued even after the deposition of Botoniates. He sailed with all his forces from Brundisium; and landing at Buthrotum in Epirus, made himself master of that place, while his son Bohemond with part of the army reduced Aulon, a celebrated port and city in the country now called Albania. From thence they advanced to Dyrrhachium, which they invested both by sea and land; but met with a most vigorous opposition from George Paleologus, whom the emperor had entrusted with the defence of that important place. In spite of the utmost efforts of the enemy, this commander held out till the arrival of the Venetian fleet, by whom Robert's navy, commanded by Bohemond, was utterly defeated, the admiral himself having narrowly escaped being taken prisoner. After this victory, the Venetians landed without loss of time, and being joined by Paleologus's men, fell upon Robert's troops with such fury, that they destroyed their works, burnt their engines, and forced them back to their camp in great disorder. As the Venetians were now masters at sea, the besieged were supplied with plenty of provisions, while a famine began to rage in the camp of the enemy; and this calamity was soon followed by a plague, which in the space of three months is said to have destroyed ten thousand men. Notwithstanding all these disasters, however, Robert did not abandon the siege: having found means to supply his famished troops with provisions, he continued it with such vigour, that the courage of the besieged began at last to fail them; and Paleologus sent repeated messages to the emperor, acquainting him that he would be obliged to surrender unless very speedily assisted. On this Alexius marched in person to the relief of the city, but was defeated with great loss by Robert. The whole right wing of Alexius's army, finding themselves hard pressed by the enemy, fled to a church dedicated to St Michael, imagining they

Constantinopolitan history.

133
Alexius Comnenus stops their progress.

134
Robert Guiscard's expedition against the emperor.

135
He passes over into Epirus and besieges Dyrrhachium.

Constantinopolitan history.

they would there find themselves in a place of safety; but the victorious army pursuing them, set fire to the church, which was burnt to ashes with all who were in it. The emperor himself with great difficulty made his escape, leaving the enemy masters of his camp and all his baggage. Soon after this defeat, the city surrendered; and Alexius being destitute of resources for carrying on the war, seized on the wealth of churches and monasteries, which gave much offence to the clergy, and had like to have occasioned great disturbances in the imperial city. At the same time, Alexius entering into an alliance with Henry emperor of Germany, persuaded him to invade the dominions of Robert in Italy. At first Henry met with great success; but was soon overcome, and driven out of that country by Robert. Bohemond, in the mean time, reduced several places in Illyricum; and, having defeated Alexius in two pitched battles, entered Thessaly, and sat down before Larissa. This place, being defended by an officer of great courage and experience in war, held out till the emperor came to its relief. Soon after his arrival, he found means to draw a strong party of Bohemond's men into an ambuscade, and cut them off almost entirely. However, in the battle which was fought a few days after, Bohemond had the advantage; but his troops mutinying and refusing to carry on the war, he was obliged to return to Italy. Alexius taking advantage of his absence, recovered several cities; and being informed that Robert was making great preparations against him, he had recourse once more to the Venetians. By them he was assisted with a powerful fleet, which defeated that of Robert in two engagements; but being soon after surprised by him, they were defeated with the loss of almost their whole navy. Robert is said to have used his victory with great barbarity, putting many of his prisoners to death with unheard-of torments. The Venetians equipped a second fleet; and joining that of the emperor, fell unexpectedly upon Robert's navy, who were riding without the least apprehension in Buthrotum, sunk most of his ships, and took a great number of prisoners, his wife and younger sons having narrowly escaped falling into their hands. Robert made great preparations to revenge this defeat; but was prevented by death from executing his designs: and, after his decease, his son Roger did not think proper to pursue so dangerous and expensive a war. He therefore recalled his troops, and the places which had been conquered by Robert and Bohemond submitted anew to the emperor.

This war was scarce ended, when the Scythians passing the Danube laid waste great part of Thrace, committing every where the greatest barbarities. Against them the emperor dispatched an army under the command of Pacurianus and Branas. The latter insisted upon engaging the enemy contrary to the opinion of his colleague; and his rashness caused the loss of the greater part of the army, who were cut off by the Scythians, together with the two generals. *Talicius*, an officer who had signalized himself on many occasions, was appointed to command the army in their room. He fell upon the enemy as they lay securely in the neighbourhood of Philippopolis, cut great numbers of them in pieces, and obliged the rest to retire in great confusion. The following spring, how-

ever, they returned in such numbers, that the emperor resolved to march against them in person. Accordingly he set out for Adrianople, and from thence to a place called *Lardea*. Here, contrary to the advice of his best officers, he ventured a battle; in which he was utterly defeated with the loss of vast numbers of his men, he himself escaping with the utmost difficulty. The next year he was attended with no better success, his army being entirely defeated with the loss of his camp and baggage. In the year following, 1084, the emperor retrieved his credit; and gave the Scythians such an overthrow, that very few escaped the general slaughter. Notwithstanding this disaster, however, they again invaded the empire in 1093. To this they were encouraged by an impostor called *Leo*, who pretended to be the eldest son of Romanus Diogenes. The young prince had been slain in a battle with the Turks; but as the Scythians only wanted a pretence to renew the war, they received the impostor with joy. By a stratagem, however, *Leo* was murdered; and the Scythians being afterwards overthrown in two great battles, were obliged to submit on the emperor's own terms.

Since the year 1083, the war had been carried on with the Turks with various success; but now an association was formed in the West against these infidels, which threatened the utter ruin of the Turkish nation. This was occasioned by the superstition of the Christians, who thought it a meritorious action to venture their lives for the recovery of the Holy Land, possessed at that time by the Turks and Saracens. Had the western princes been properly assisted by the emperors of the East in this undertaking, the Turks had undoubtedly been unable to resist them; but so far from this, the Latins were looked upon by them as no less enemies than the Turks; and indeed whatever places they took from the infidels, they never thought of restoring to the emperors of Constantinople, to whom they originally belonged, but erected a number of small independent principalities; which neither having sufficient strength to defend themselves, nor being properly supported by one another, soon became a prey to the Turks. In the year 1203, happened a dreadful fire at Constantinople, occasioned by some Latin soldiers. These had plundered a mosque, which the Turks residing in Constantinople had been suffered to build there. For this reason they were attacked by the infidels; who being much superior to them in number, the Latins found themselves obliged to set fire to some houses, in order to make their escape with safety. The flame spreading in an instant from street to street, reduced in a short time great part of the city to ashes, with the capacious store-houses which had been built at a vast expence on the quay. The late emperor Isaac Angelus, who had been restored to his throne by the Latins, died soon after their departure from Constantinople, leaving his son Alexius sole master of the empire. The young prince, to discharge the large sums he had promised to the French and Venetians for their assistance, was obliged to lay heavy taxes on his subjects; and this, with the great esteem and friendship showed to his deliverers, raised a general discontent among the people of Constantinople, who were sworn enemies to the Latins. This encouraged John Ducas, surnamed *Murtzuphlus*, from his joined

Constantinopolitan history.

139 The Romans defeated.

140 They at last defeated the Scythians.

141 The Holy War.

142 Dreadful fire at Constantinople.

136 The city surrenders.

137 The war ended by the death of Robert.

138 The Scythian war.

Constantinopolitan history.

143
Murtzuphlus strangles the emperor.

144
The city taken and plundered by the Latins.

and thick eye-brows, to attempt the sovereignty. Unhappily he found means to put his treacherous designs in execution; and strangled the young prince with his own hands. After this he presented himself to the people; told them what he had done, which he pretended was in order to secure their liberties; and earnestly intreated them to choose an emperor who had courage enough to defend them against the Latins that were ready to oppress and enslave them. On this he was instantly saluted emperor by the inconstant multitude; but this usurpation proved the ruin of the city. The Latins immediately resolved to revenge the death of the young prince; and, as they had been so often betrayed and retarded in their expeditions to the Holy Land by the emperors of Constantinople, to make themselves masters of that city, and seize the empire for themselves. In consequence of this resolution they mustered all their forces in Asia, and having crossed the straits, laid siege to Constantinople by sea and land. The tyrant, who was a man of great courage and experience in war, made a vigorous defence. The Latins, however, after having battered the walls for several days together with an incredible number of engines, gave a general assault on the 8th of April 1204. The attack lasted from break of day till three in the afternoon, when they were forced to retire, after having lost some of their engines, and a great number of men. The assault was nevertheless renewed four days after; when, after a warm dispute, the French planted their standard on one of the towers; which the Venetians observing, they quickly made themselves masters of four other towers, where they likewise displayed their ensigns. In the mean time three of the gates being broke down by the battering rams, and those who had scaled the walls having killed the guards, and opened the gates between the towers they had taken, the whole army entered, and drew up in battle array between the walls. The Greeks fled up and down in the greatest confusion; and several parties were by the Latins dispatched to scour the streets, who put all they met to the sword, without distinction of age or condition. Night put a stop to the dreadful slaughter, when the princes founding the retreat, placed their men in different quarters of the city, with orders to be upon their guard, not doubting but they should be attacked early next morning. They were surprised, however, at that time by the entire submission of the Greeks; to whom they promised their lives, but at the same time ordering them to retire to their houses, they gave up the city to be plundered by the soldiers for that day. They strictly enjoined their men to abstain from slaughter, to preserve the honour of the women, and to bring the whole booty into one place, that a just distribution might be made according to the rank and merit of each individual. The Greeks had undoubtedly concealed their most valuable effects during the night; many persons of the first rank had escaped, and carried along with them immense treasures; the soldiers had probably, as is usual in all such cases, reserved things of great value for themselves, notwithstanding all prohibitions to the contrary; and yet the booty, without the statues, pictures, and jewels, amounted to a sum almost incredible. As for Murtzuphlus, he made his escape in the night; embarking on a small vessel

with *Euphrosyne*, the wife of *Alexius Angelus* a late usurper, and her daughter *Eudoxia*, for whose sake he had abandoned his lawful wife.

Constantinopolitan history.

Constantinople continued subject to the Latins till the year 1261, when they were expelled by one *Alexius Strategopulus*. He was a person of an illustrious family; and, for his eminent services, distinguished with the title of *Cesar*. He had been sent against *Alexius Angelus* despot of Epirus, who now attempted to recover some places in Thessaly and Greece from *Michael Paleologus*, one of the Greek emperors, that, since the capture of Constantinople, had kept their court at Nice; and to try whether he could on his march surprise the imperial city itself. *Alexius*, having passed the straits, encamped at a place called *Rhegium*, where he was informed by the natives that a strong body of the Latins had been sent to the siege of *Daphnusa*, that the garrison was in great want of provisions, and that it would be no difficult matter to surprise the city. Hereupon the Greek general resolved at all events to attempt it; in which he was encouraged by some of the inhabitants, who, coming privately to his camp, offered themselves to be his guides. He approached the walls in the dead of the night, which some of his men scaled without being observed; and, killing the centries whom they found asleep, opened one of the gates to the rest of the army. The Greeks rushing in, put all they met to the sword; and at the same time, to create more terror, set fire to the city in four different places. The Latins, concluding from thence that the enemy's forces were far more numerous than they really were, did not so much as attempt either to drive them out or to extinguish the flames. In this general confusion, the emperor *Baldwin*, quitting the ensigns of majesty, fled with *Justinian* the Latin patriarch, and some of his intimate friends, to the sea-side; and there, embarking on a small vessel, sailed first to *Eubœa*, and afterwards to *Venice*, leaving the Greeks in full possession of Constantinople. When news of this surprising and altogether unexpected success of *Alexius* were first brought to *Paleologus*, he could scarce give credit to it; but receiving soon after letters from *Alexius* himself, with a particular account of so memorable an event, he ordered public thanks to be returned in all the churches, appeared in public in his imperial robes, attended by the nobility in their best apparel, and ordered couriers to be dispatched with the agreeable news into all parts of the empire.

146
Entry of *Michael Paleologus* into the city.
Soon after, having settled his affairs at Nice, he set out for Constantinople with the empress, his son *Andronicus*, the senate, and nobility, to take possession of the imperial city, and fix his residence in that place that had originally been designed for the seat of the eastern empire. Having passed the straits, he advanced to the *golden gate*, and continued some days without the walls, while the citizens were busied in making the necessary preparations to receive him with a magnificence suitable to the occasion. On the day appointed, the *golden gate*, which had been long shut up, was opened, and the emperor entering it amidst the repeated acclamations of the multitude, marched on foot to the great palace. He was preceded by the bishop of *Cyzicus*, who carried an image of the Virgin *Mary*, supposed to have been done by *St Luke*, and fol-

Constantinopolitan history.

147
He resolves to restore it to its former grandeur.

followed by all the great officers, nobility, and chief citizens, pompously dressed. Public thanks were again returned to the church of St. Sophia, at which the emperor assisted in person, with the clergy, the senate, and nobility. These exercises were succeeded by all sorts of rejoicings; after which the emperor carefully surveyed the imperial city. This survey greatly allayed his joy. He saw the stately palaces and other magnificent buildings of the Roman emperors lying in ruins; the many capacious buildings that had been erected by his predecessors, at an immense charge, destroyed by fire, and other unavoidable accidents, of war; several streets abandoned by the inhabitants, and choaked up with rubbish, &c. These objects gave the emperor no small concern, and kindled in him a desire of restoring the city to its former lustre. In the mean time, looking upon Alexius as the restorer of his country, he caused him to be clad in magnificent robes; placed with his own hand a crown on his head; ordered him to be conducted through the city, as it were in triumph; decreed that for a whole year the name of Alexius should be joined in the public prayers with his own: and, to perpetuate the memory of so great and glorious an action, he commanded his statue to be erected on a stately pillar of marble before the church of the Apostles. His next care was to re-people the city, many Greek families having withdrawn from it while it was held by the Latins, and the Latins now preparing to return to their respective countries. The former were recalled home; and the latter, in regard of the great trade they carried on, were allowed many valuable privileges, which induced them not to remove. The Greeks were allowed to live in one of the most beautiful quarters of the city, to be governed by their own laws and magistrates, and to trade without paying customs or taxes of any kind. Great privileges were likewise granted to the natives of Venice and Pisa, which encouraged them to lay aside all thoughts of removing, and the trade they carried on proved afterwards highly advantageous to the state.

148
Great disturbances occasioned by the treachery of Palæologus.

It was not long, however, before these regulations were altered. The emperor being soon after informed that Baldwin, lately expelled from Constantinople, had married his daughter to Charles king of Sicily, and given him, by way of dowry, the imperial city itself, he ordered the Genoese, who were become very numerous, to remove first to Heraclea, and afterwards to Galata, where they continued. As for the Pisans and Venetians, who were not so numerous and wealthy, they were allowed to continue in the city. Palæologus, though he had caused himself to be proclaimed emperor, and was possessed of absolute sovereignty, was as yet only guardian to the young emperor John Lascaris, then about 12 years of age. But having now settled the state, and having gained the affections both of natives and foreigners, he began to think of securing himself and his posterity in the full enjoyment of the empire; and for this reason cruelly ordered the eyes of the young prince to be put out, pretending that none but himself had any right to the city or empire of Constantinople, which he alone had recovered out of the hand of the Latins.

This piece of treachery and inhumanity involved him in great troubles. The patriarch immediately excom-

municated him; and he would in all probability have been driven from the throne by a combination of the western princes, had he not engaged Pope Urban IV. to espouse his cause, by promising to submit himself and his dominions to the Latin church. Thus, indeed, he diverted the present storm; but this proceeding caused the greatest disturbances, not only in Constantinople, but throughout the whole empire, nor was Palæologus able to reconcile his subjects to this union.

In 1283 Michael died, and was succeeded by his son Andronicus. His first step was to restore the ancient Greek ceremonies, thinking he could not begin his reign with a more popular act. But thus he involved himself in difficulties still greater than before. Though Michael had not been able fully to reconcile his Greek subjects to the Latin ceremonies, yet he had in some degree accomplished his purpose. The Latins had got a considerable footing in the city, and defended their ceremonies with great obstinacy; so that the empire was again thrown into a ferment by this imprudent step.

All this time the Turks had been continuing their encroachments on the empire, which had it not been for the crusades published against them by the Pope, they would in all probability have made themselves masters of before this time. They were now, however, very successfully opposed by Constantine the emperor's brother: but his valour rendered him suspected by the emperor; in consequence of which he was thrown into prison, along with several persons of great distinction. On the removal of this brave commander, the Turks, under the famous Othman, made themselves masters of several places in Phrygia, Caria, and Bithynia; and, among the rest, of the city of Nice. To put a stop to their conquests, the emperor dispatched against them Philanthropenus and Libadarius, two officers of great experience in war. The former gained some advantages over the enemy; but being elated with his success, caused himself to be proclaimed emperor. This rebellion, however, was soon suppressed, Philanthropenus being betrayed by his own men: but the Turks taking advantage of these intestine commotions, not only extended their dominions in Asia, but conquered most of the islands in the Mediterranean; and, being masters at sea, infested the coasts of the empire, to the utter ruin of trade and commerce.

From this time the Roman empire tended fast to dissolution. After the revolt of Philanthropenus, the emperor could no longer trust his subjects, and therefore hired the Massagetes to assist him: but they, behaving in a careless manner, were first defeated by their enemies, and afterwards turned their arms against those they came to assist. He next applied to the Catalans, who behaved in the same manner; and having ravaged the few places left the emperor in Asia, returned into Europe, and called the Turks to their assistance.

This happened in the year 1292, and was the first appearance of the Turks in Europe. This enterprise, however, was unsuccessful. Having loaded themselves with booty, they offered to depart quietly if they were allowed a safe passage, and ships to transport them to Asia. To this the emperor, willing to get rid of such troublesome guests, readily consented, and ordered the vessels

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149
Union of the Greek and Latin churches.

150
Dissolved.

151
War with the Turks.

152
Their first appearance in Europe.

vessels

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vesseles to be got ready with all possible expedition. But the Greek officers observing the immense booty with which they were loaded, resolved to fall upon them in the night, and cut them all off at once. This scheme, however, was not managed with such secrecy but that the Turks had notice of it, and therefore prepared for their defence. They first surprised a strong castle in the neighbourhood, and then found means to acquaint their countrymen in Asia with the dangerous situation. Their brethren, enticed with the hopes of booty, were not long of coming to their assistance; and having crossed the Hellespont in great numbers, ravaged the adjacent country, making excursions to the very gates of Constantinople. At last the emperor determined to root them out; and accordingly marched against them with all his forces, the country people flocking to him from all quarters. The Turks at first gave themselves over for lost; but finding the Greeks negligent of discipline, they attacked their army unexpectedly, utterly defeated it, and made themselves masters of the camp. After this unexpected victory, they continued for two years to ravage Thrace in the most terrible manner. At last, however, they were defeated; and being afterwards shut up in the Chersonesus, they were all cut in pieces or taken.

153
They are all cut in pieces or taken.

Soon after new commotions took place in this unhappy empire, of which the Turks did not fail to take the advantage. In 1327 they made themselves masters of most of the cities on the Mæander; and, among the rest, of the strong and important city of Prusa in Bithynia. The next year, however, Othoman, who may justly be styled the founder of the Turkish monarchy, being dead, the emperor laid hold of that opportunity to recover Nice, and some other important places, from the infidels. But these were lost the year following, together with Abydus and Nicomedia: and in 1330 a peace was concluded upon condition that they should keep all their conquests. This peace they observed no longer than served their own purposes; for new commotions breaking out in the empire, they pursued their conquests, and by the year 1357 had reduced all Asia. They next passed the Hellespont under the conduct of Solomon the son, or as others will have it, the brother of Orchane, the successor of Othoman, and seized on a strong castle on the European side. Soon after the Turkish sultan died, and was succeeded by Amurath. He extended the conquests of his predecessors, and in a short time reduced all Thrace, making Adrianople the seat of his empire. Amurath was slain by treachery in a little time after, and was succeeded by his son Bajazet. This prince greatly enlarged his dominions by new conquests. In a short time he reduced the countries of Thessaly, Macedon, Phocis, Peloponnesus, Mysia, and Bulgaria, driving out the despots or petty princes who ruled there. Elated with his frequent victories, he began to look upon the Greek emperor, to whom nothing was now left but the city of Constantinople and the neighbouring country, as his vassal. Accordingly he sent him an arrogant and haughty message, commanding him to pay a yearly tribute, and send his son Manuel to attend him in his military expeditions. This demand the emperor was obliged to comply with, but died soon after in the year 1392.

154
Adrianople taken by the Turks.

Manuel no sooner heard of his father's death than

he hastened to Constantinople, without taking leave of the sultan, or acquainting him with the reasons of his sudden departure. At this Bajazet was so highly offended, that he passed with great expedition out of Bithynia into Thrace, ravaged the country adjoining to Constantinople, and at last invested the city itself both by sea and land. In this extremity Manuel had recourse to the western princes; who sent him an army of 130,000 men, under the command of Sigismund king of Hungary, and John count of Nevers. But though the western troops proved at first successful, they were in the end defeated with great slaughter by Bajazet, who then turned to the siege with greater vigour than ever. As he found, however, that the citizens were determined to hold out to the last, he applied to John, the son of Manuel's elder brother, who had a better title to the crown than Manuel himself. With him he entered into a private agreement, by virtue of which Bajazet was to place John upon the throne of Constantinople; on the other hand, John was to deliver up the city to the Turks, and remove the imperial seat to Peloponnesus, which the sultan promised to relinquish to him and his posterity. At the same time he sent deputies to the inhabitants of Constantinople, offering to withdraw his army, and cease from further hostilities, provided they expelled Manuel and placed John upon the throne. This proposal rent the city into two factions; but Manuel prevented the mischiefs which were ready to ensue, by a voluntary resignation, upon condition that he should be allowed to retire to whatever place he thought proper with his wife and children.

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155
Bajazet besieges Constantinople.

With this condition John readily complied; and Manuel having received him into the city, and conducted him to the palace, set sail for Venice. From thence he went to the courts of all the western princes to solicit their assistance against the Turks, whose power was grown formidable to all Europe. He was every where received with the greatest demonstrations of esteem, and promised large supplies; all Christendom being now alarmed at the progress of the infidels.

In the mean time Bajazet did not fail to put John in mind of his promise; but the citizens refusing to comply with such a scandalous treaty, the siege was renewed, and the city assaulted with more fury than ever. When it was already reduced to the last extremity, news were brought the sultan that Tamerlane, the victorious Tartar, having over-run all the East with incredible celerity, had now turned his arms against the Turks, and was preparing to break into Syria. Bajazet, alarmed at the danger that threatened him, raised the siege in great haste, and advanced against Tamerlane with a very numerous and well disciplined army; but the Tartar totally defeated and took him prisoner, after having cut most of his men in pieces: and thus Constantinople was preserved for the present.

156
He is defeated and taken prisoner by Tamerlane.

But this relief was of short duration. In 1424 the city was again besieged by Amurath II. The inhabitants defended themselves with great bravery; but must in the end have submitted, had not the emperor prevailed upon the prince of Caramania to countenance an impostor and pretender to the Turkish throne. This obliged Amurath to raise the siege, and march with all his forces against the usurper, whom he soon reduced.

157
Amurath besieges Constantinople.

158
The siege raised.

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159
Success of John Hunniades against the Turks.

160
He is at last defeated.

161
Constantinople besieged by Mohammed.

reduced. Having then no other enemies to contend with, he entered Macedon at the head of a powerful army; and having ravaged the country far and near, he took and plundered Thessalonica, as he did also most of the cities of Ætolia, Phocis, and Bœotia. From Greece he marched into Servia; which country he soon reduced. He next broke into the dominions of the king of Hungary, and besieged the strong city of Belgrade; but here he met with a vigorous repulse, no fewer than 15,000 Turks being slain by the Christians in one sally, which obliged the sultan to drop the enterprize and retire.

In his retreat he was attacked by the celebrated John Hunniades, who cut great numbers of his men in pieces, and obliged the rest to fly with precipitation. Not long after he gained a still more complete victor over the enemy in the plains of Transylvania, with the loss of only 3000 of his own men, whereas 20,000 of the Turks were killed on the field of battle, and almost an equal number in the pursuit. Amurath, who was then at Adrianople, sent an army into Transylvania far more numerous than the former; but they were attended with no better success, being cut off almost to a man by the brave Hungarian. He gained several other victories no less remarkable; but was at last entirely defeated in 1448; and with this defeat ended all hopes of preserving the Roman empire. The unhappy emperor was now obliged to pay an annual tribute of 300,000 aspers to the sultan; and to yield up to him some strong holds which he still held on the Euxine Sea. However, as he doubted not but Amurath would soon attempt to become master of the city itself, he renewed the union between the Greek and Latin churches, hoping that this would induce the western princes to assist him in the defence of the city against the Turks. This union produced great disturbances, which the emperor did not long survive, but died in 1448 leaving the empire, now confined within the walls of Constantinople, to his brother Constantine.

Amurath the Turkish sultan died in 1450, and was succeeded by his son Mohammed. In the beginning of his reign he entered into an alliance with Constantine, and pretended a great desire to live in friendship with him and the other Christian princes; but no sooner had he put an end to a war in which he was engaged with Ibrahim king of Caramania, than he built a strong fort on the European side of the Bosphorus, opposite, to another in Asia; in both of which he placed strong garrisons. These two castles commanded the Straits; and the former being but five miles from the city, kept it in a manner blocked up. This soon produced a misunderstanding between him and the emperor, which ended in the siege of the city.

The siege commenced on the sixth of April 1453, Mohammed's numerous forces covering the plains before it on the land-side, and a fleet of 300 sail blocking it up by sea. The emperor, however, had taken care to secure the haven, in which were three large ships, 20 small ones, and a great number of galleys, by means of a chain drawn cross the entrance. Mohammed began the siege by planting batteries as near the city as he could, and raising mounts in several places as high as the walls themselves, whence the besieged were incessantly galled with showers of arrows.

He had in his camp a piece of ordinance of prodigious size, which is said to have carried a ball of 100 pounds weight made of hard black stone brought from the Euxine Sea. With this vast piece the enemy made several breaches in the walls; which, however, were repaired with incredible expedition by the besieged. But Mohammed, the better to carry on the siege, caused new levies to be made throughout his extensive dominions, by which his army was soon increased to near 400,000 men; while the garrison consisted only of 9000 regular troops, viz. 6000 Greeks and 3000 Genoese and Venetians. As the enemy continued to batter the walls day and night without intermission, a great part of them was at last beaten down; but while the Turks were busy in filling up the ditch, in order to give the assault, a new wall was built. This threw the tyrant into a prodigious rage, which was greatly heightened when he saw his whole fleet worsted by five ships, four of which were laden with corn from Peloponnesus, and the others with all manner of provisions from the isle of Chios. These opened themselves a way through the whole Turkish fleet; and, to the inexpressible joy of the Christians, at last got safe into the harbour.

The Turks attempted several times to force the haven; but all their efforts proving ineffectual, Mohammed formed a design of conveying 80 galleys over land for the space of eight miles into it. This he accomplished by means of certain engines, the contrivance of a renegado; and having then either taken or sunk all the ships contained in it, he caused a bridge to be built over it with surprising expedition. By this means the city was laid open to an assault from that side likewise. The place was now assaulted on all sides; and Constantine being well apprised that he could not long hold out against such a mighty fleet and so numerous an army, sent deputies to Mohammed offering to acknowledge himself his vassal, by paying him yearly what tribute he should think proper to impose, provided he raised the siege and withdrew. The tyrant answered that he was determined at all events to become master of the city: but if the emperor delivered it up forthwith, he would yield up to him Peloponnesus, and other provinces to his brothers, which they should enjoy peaceably as his friends and allies: but if he held out to the last extremity, and suffered it to be taken by assault, he would put him and the whole nobility to the sword, abandon the city to be plundered by his soldiers, and carry the inhabitants into captivity.

This condition was rashly rejected by the emperor; who thereby involved himself and all his subjects in the most terrible calamity. The siege was renewed with more vigour than ever, and continued till the 25th of May; when a report being spread in the Turkish camp that a mighty army was advancing in full march to the relief of the city under the conduct of the celebrated John Hunniades, the common soldiers, seized with a panic, began to mutiny, and press Mohammed in a tumultuous manner to break up the siege. Nay, they openly threatened him with death, if he did not immediately abandon the enterprize and retire from before the city, which they despaired of being able to reduce before the arrival of the supposed succours. Mohammed was upon the point of complying with their demand,

162
He conveyed 80 galleys over land into the haven.

163
A mutiny in the Turkish camp.

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mand, when he was advised by Zagan, a Turkish officer of great intrepidity, and an irreconcilable enemy to the Christian name, to give without loss of time a general assault. To this he said the soldiery, however mutinous, would not be averse, provided the sultan solemnly promised to abandon the city to be plundered by them. As such an advise best suited the humour of Mohammed, he readily embraced it; and caused a proclamation to be published throughout the camp, declaring, that he gave up to his soldiers all the wealth of that opulent city, requiring to himself only the empty houses.

164
A general assault given.

The desire of plunder soon got the better of that fear which had seized the Turkish army; and they unanimously desired to be led on to the attack. Hereupon Constantine was summoned for the last time to deliver up the city, with a promise of his life and liberty; but to this he answered, that he was unalterably determined either to defend the city or to perish with it. The attack began at three in the morning on Tuesday the 29th of May; such troops were first employed as the sultan valued least, and designed them for no other purpose than to tire the Christians, who made a prodigious havoc of that disorderly multitude. After the carnage had lasted some hours, the Janizaries and other fresh troops advanced in good order, and renewed the attack with incredible vigour. The Christians, summoning all their courage and resolution, twice repulsed the enemy: but being in the end quite spent, they were no longer able to stand their ground; so that the enemy in several places broke into the city. In the mean time Justiniani, the commander of the Genoese and a select body of Greeks, having received two wounds, one in the thigh and the other in the hand, was so disheartened, that he caused himself to be conveyed to Galata, where he soon after died of grief. His men, dismayed at the sudden flight of their general, immediately quitted their posts and fled in the utmost confusion. How-

165
Bravery of the emperor.

ever, the emperor, attended with a few of the most resolute among the nobility, still kept his post, striving with unparalleled resolution to oppose the multitude of barbarians that now broke in from every quarter. But being in the end overpowered with numbers, and seeing all his friends lie dead on the ground, "What! (cried he aloud), is there no Christian left alive to strike off my head?" He had scarce uttered these words, when one of the enemy, not knowing him, gave him a deep cut across the face with his sabre; and at the same time, another coming behind him, with a blow on the back part of his head laid him dead on the ground. After the death of the emperor, the few Christians that were left alive betook themselves to flight; and the Turks, meeting with no further opposition, entered the city, which they filled with blood and slaughter. They gave no quarter, but put all they met to the sword, without distinction. Many thousands took refuge in the church of St Sophia, but they were all massacred in their asylum by the enraged barbarians; who, prompted by their natural cruelty, the desire of revenge, and love of booty, spared no place nor person. Most of the nobility were, by the sultan's orders, cut off, and the rest kept for purposes more grievous than death itself. Many of the inhabitants, among whom were some men of great learning, found

166
He is killed.

167
The town plundered and the inhabitants massacred.

means to make their escape while the Turks were busied in plundering the city. These embarking on five ships then in the harbour, arrived safe in Italy; where, with the study of the Greek tongue, they revived the liberal sciences, which had long been neglected in the West. After the expiration of three days, Mohammed commanded his soldiers to forbear all further hostilities on pain of death; and then put an end to as cruel a pillage and massacre as any mentioned in history. The next day he made his public and triumphal entry into Constantinople, and chose it for the seat of the Turkish empire, which it has continued to be ever since.

This city now called by the Turks *Islampol*, and by the Greeks *Islampoli* or *Stampoli*. It is seated at the eastern extremity of Romania, on a small neck of land which advances towards Natolia, from which it is separated by a channel of a mile in breadth. The sea of Marmora washes its walls on the south, and a gulph of the channel of Constantinople does the same on the north. It is delightfully situated between the Black Sea and the Archipelago, from whence it is supplied with all necessaries. The grand seignior's palace, called the *Seraglio*, is seated on the sea-side, and is surrounded with walls flanked with towers, and separated from the city by canals. It is said the harbour will easily hold 1200 ships. The number of houses must needs be prodigious, since one fire has burnt down 30,000 in a day, without greatly changing the aspect of the city. However, in general, they are but mean, especially on the outside, where there are few or no windows; and the streets being narrow, gives them a melancholy look. They reckon that there are 3770 streets, small and great; but they are seldom or never clean; and the people are infected with the plague almost every year. The inhabitants are half Turks, two-thirds of the other half Christians, and the rest Jews. Here are a great number of ancient monuments still remaining, and particularly the superb temple of Sophia, which is turned into a mosque, and far surpasses all the rest. The street called *Adrianople* is the longest and broadest in the city; and the bazars, or bezesteins, are the markets for selling all sorts of merchandize. The old and the new are pretty near each other; and are large square buildings, covered with domes, and supported by arches and pilasters. The new is the best, and contain all sorts of goods which are there exposed to sale. The market for slaves, of both sexes, is not far off; and the Jews are the principle merchants, who bring them here to be sold. There are a great number of young girls brought from Hungary, Greece, Candia, Russia, Mingrelia, and Georgia, for the service of the Turks, who generally buy them for their seraglios. The great square, near the mosque of sultan Bajazet, is the place for public diversions, where the jugglers and mountebanks play a great variety of tricks. The circumference of this city is by some said to be 15 miles, and by Mr Tournefort 23 miles; to which if we add the suburbs, it may be 34 miles in compass. The suburb called *Pera* is charmingly situated; and is the place where the ambassadors of England, France, Venice, and Holland, reside. This city is built in the form of a triangle; and as the ground rises gradually, there is a view of the whole town from the sea. The public

buildings,

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Present state of the city.

Constat
||
Constitu-
tion.

buildings, such as the palaces, the mosques, bagnios, and caravansaries for the entertainment of strangers, are many of them very magnificent. E. Long. 29. 20. N. Lat. 41. 4.

CONSTAT, in law, the name of a certificate which the clerk of the pipe and auditors of the exchequer make at the request of any person who intends to plead or move in that court for the discharge of any thing; and the effect of it is, the certifying what does *constare* upon record touching the matter in question.—A *constat* is held to be superior to a certificate; because this may err or fail in its contents; that cannot, as certifying nothing but what is evident upon record.

Also the exemplification under the great seal of the enrolment of any letters patent is called a *constat*.

CONSTELLATION, in astronomy, a system of several stars that are seen in the heavens near to one another. Astronomers not only mark out the stars, but, that they may better bring them into order, they distinguish them by their situation and position in respect to each other; and therefore they distribute them into asterisms or constellations, allowing several stars to make up one constellation: and for the better distinguishing and observing them, they reduce the constellations to the forms of animals, as men, bulls, bears, &c.; or to the images of some things known, as of a crown, a harp, a balance, &c.; or give them the names of those whose memories, in consideration of some notable exploit, they had a mind to transmit to future ages.

The division of the stars by images and figures is of great antiquity, and seems to be as old as astronomy itself: for in the most ancient book of Job, Orion, Arcturus, and the Pleiades, are mentioned; and we meet with the names of many of the constellations in the writings of the first poets, Homer and Hesiod.

The ancients, in their division of the firmament, took in only so much as came under their notice, distributing it into 48 constellations; but the modern astronomers comprehend the wholly starry firmament, dividing it into three regions. See *ASTRONOMY-Index*.

CONSTERNATION is defined by ethical writers to be an excess of horror, owing to the ill government of our admiration and fear: or such an immoderate degree of fear as confounds the faculties, and incapacitates a person for consultation and execution.

CONSTIPATION, in medicine, a hardness of the belly, with great costiveness. See *COSTIVENESS*.

CONSTITUENT PART, in physiology, an essential part in the composition of any thing, differing little from what is otherwise called *element* or *principle*.

CONSTITUTION, in matters of policy, signifies the form of government established in any country or kingdom.

CONSTITUTION also denotes an ordinance, decision, regulation, or law, made by authority of any superior, ecclesiastical or civil.

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Apostolical Constitutions, a collection of regulations attributed to the apostles, and supposed to have been collected by St Clement, whose name they likewise bear.

Constitu-
tion.

It is the general opinion, however, that they are spurious, and that St Clement had no hand in them. They appeared first in the 4th age, but have been much changed and corrupted since that time. They are divided into eight books, consisting of a great number of rules and precepts, relating to the duties of Christians, and particularly the ceremonies and discipline of the church. Mr Whiston, in opposition to the general opinion, asserts them to be a part of the sacred writings, dictated by the apostles in their meetings, and written down from their own mouth by St Clement; and intended as a supplement to the New Testament, or rather as a system of Christian faith and polity. The reason why the Constitutions are suspected by the orthodox, and perhaps the reason also why their genuineness is defended by Mr Whiston, is, that they seem to favour Arianism.

CONSTITUTION, in a physical sense, signifies the particular temperature of the body.

It is curious to observe, says Dr Percival, the revolution which hath taken place, within this century, in the constitutions of the inhabitants of Europe. Inflammatory diseases more rarely occur, and, in general, are much less rapid and violent in their progress than formerly (A); nor do they admit of the same antiphlogistic method of cure that was practised with success 100 years ago. The experienced Sydenham makes 40 ounces of blood the mean quantity to be drawn in the acute rheumatism; whereas this disease, as it now appears in the London hospitals, will not bear above half that evacuation. Vernal intermittents are frequently cured by a vomit and the bark, without venesection; which is a proof that at present they are accompanied with fewer symptoms of inflammation than they were wont to be. This advantageous change, however, is more than counterbalanced by the introduction of a numerous class of nervous ailments, in a great measure unknown to our ancestors; but which now prevail universally, and are complicated with almost every other distemper. The bodies of men are enfeebled and enervated; and it is not uncommon to observe very high degrees of irritability, under the external appearance of great strength and robustness. The hypochondria, palsies, cachexies, dropies, and all those diseases which arise from laxity and debility, are in our days endemic every where; and the hysterics, which used to be peculiar to the women, as the name itself indicates, now attack both sexes indiscriminately. It is evident that so great a revolution could not be effected without a concurrence of many causes; but amongst these (according to Dr Percival), the present general use of tea* holds the first and principal rank. The second place may perhaps be allowed to excess in spirituous liquors. This pernicious custom, in many instances at least, owes its rise to the former, which,

*See Tea

3 B

(A) The decrease in the violence of inflammatory diseases may perhaps in part be ascribed to the present improved method of treating them. Moderate evacuations, cool air, acescent diet, and the liberal use of saline and antimonial medicines, are better adapted to check the progress of fevers, than copious bleedings, stimulating purgatives, and profuse sweats excited by theriaca and mithridate.

Constrictor which, by the lowness and depression of spirits it occasions, renders it almost necessary to have recourse to something cordial and exhilarating. And hence proceed those odious and disgraceful habits of intemperance, with which many of the softer sex are now, alas! chargeable.

CONSTRUCTOR, an appellation given to several muscles, on account of their constringing or closing some of the orifices of the body.

CONSTRUCTION, in geometry, is the drawing such lines, such a figure, &c. as are previously necessary for making any demonstration appear more plain and undeniable.

CONSTRUCTION of Equations. See **EQUATIONS**.

CONSTRUCTION, in grammar; syntax, or the arranging and connecting the words of a sentence according to the rules of the language. See **GRAMMAR**, and **LANGUAGE**.

The construction is generally more simple, easy, and direct, in the modern tongues than in the ancient: we have very few of those inversions which occasion so much embarrassment and obscurity in the Latin; our thoughts are usually delivered in the same order wherein the imagination conceives them: the nominative case, for instance, always precedes the verb, and the verb goes before the oblique cases it governs.

The Greeks and Latins, M. St. Evremont observes, usually end their periods, where, in good sense and reason, they should have begun; and the elegance of their language consists, in some measure, in this capricious arrangement, or rather in this transposal and disorder of the words. See **LANGUAGE**.

CONSTRUCTION of Statutes, among lawyers. See **LAW**, Part II. n° 49.

CONSUALIA, in antiquity, feasts which were held among the ancients, in honour of the god *Consus* i. e. Neptune; different from those other feasts of the same deity called *Neptunalia*. They were introduced with a magnificent cavalcade, or procession on horseback; because Neptune was reputed to have first taught men the use of horses; whence his surname of *ἵππος*, *Equestris*.

Evander is said to have first instituted this feast: it was re-established by Romulus, under the name of *Consus*; because it was some god under the denomination of *Consus* that suggested to him the rape of the Sabines. It is said, that it was with a view to this rape that he made that establishment. This, however, is certain, that it was to this feast all his neighbours were invited; when, taking advantage of the solemnities and sacrifices, he seized the women. To draw the greater concourse of people, he gave out, that he had found an altar hid under ground, which he intended to consecrate, with sacrifices to the god to whom it had been originally erected. Those who take upon them to explain the mysteries of the heathen theology, say, that the altar hid under ground, is a symbol of the secret design of Romulus to seize his neighbours wives.

The consualia were of the number of feasts called sacred; as being consecrated to a divinity.—Originally they were not distinguished from those of the Circus: whence it is, that Valerius Maximus says, that the rape of the Sabines was effected at the games of the Circus.

Plutarch observes, that during the days of this solemnity, horses and asses were left at rest, and were dressed up with crowns, &c. on account of its being the feast of *Neptunus Equestris*.—Festus says, the cavalcade was performed with mules; it being an opinion, that this was the first animal used to draw the car.

Servius gives us to understand, that the consualia fell on the 13th of August; Plutarch, in the life of Romulus, places them on the 18th, and the old Roman calendar on the 21st of that month.

CONSUBSTANTIAL, in theology, a term of like import with co-essential; denoting something of the same substance with another. The orthodox believe the Son of God to be consubstantial with the Father.

The term *ὁμοουσιος*, *consubstantial*, was first adopted by the fathers of the councils of Antioch and Nice, to express the orthodox doctrine the more precisely, and to serve as a barrier and precaution against the errors and subtleties of the Arians; who owned every thing excepting the consubstantiality.

The Arians allowed, that the word was God, as having been made God; but they denied that he was the same God, and of the same substance with the Father: accordingly they exerted themselves to the utmost to abolish the use of the word. The emperor Constantine used all his authority with the bishops to have it expunged out of the symbols; but it still maintained itself, and is at this day, as it was then, the distinguishing criterion between an Athanasian and an Arian.

Sandius will have it, that the word consubstantial was unknown till the time of the council of Nice; but it is certain it had been before proposed to the council of Antioch, wherein Paulus Samosatenus had been condemned; though it had there the fortune to be rejected. Curcellæus, on the other hand, maintains that it was an innovation in doctrine in the council of Nice, to admit an expression, the use whereof had been abolished by the council of Antioch.

According to St Athanasius, the word consubstantial was only condemned in the council of Antioch, inasmuch as it implied the idea of a pre-existent matter, prior to the things formed thereof: now, in this sense, it is certain, the Father and the Son are not consubstantial, there having been no pre-existent matter.

CONSUBSTANTIATION, a tenet of the Lutheran church with regard to the manner of the change made in the bread and wine in the eucharist. The divines of that profession maintain, that after consecration, the body and blood of our Saviour are substantially present, together with the substance of the bread and wine, which is called consubstantiation, or impanation.

CONSUL, the chief magistrate of the Roman commonwealth, invested with regal authority for the space of one year. They were two in number, called *consules a consulendo*, and annually chosen in the Campus Martius. The two first consuls were L. Jun. Brutus, and L. Tarquinius Collatinus, chosen in the year of Rome 244, after the expulsion of the Tarquins. In the first times of the republic the two consuls were always chosen from Patrician families or noblemen, but the people

Consub-
stantial
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Consul.

Consul.

Consul
Contagion.

ple obtained the privilege in the year of Rome 388, of electing one of the consuls from their own body, and sometimes both were plebeians. The first consul among the plebeians was L. Sextius. It was required that every candidate for the consulship should be 43 years of age, called *legitimum tempus*. He was always to appear at the election as a private man without a retinue, and it was requisite before he canvassed for the office to have discharged the functions of quæstor, edile, and prætor. Sometimes these qualifications were disregarded. Val. Corvinus was made a consul in his 23d year, and Scipio in his 24th. Young Marius, Pompey, and Augustus, were also under the proper age when they were invested with the office, and Pompey had never been quæstor or prætor. The power of the consuls was unbounded, and they knew no superior but the gods and the laws; but after the expiration of their office their conduct was minutely scrutinized by the people, and misbehaviour was often punished by the laws. The badges of their office was the *prætecta*, a robe fringed with purple, afterwards exchanged for the *toga picta* or *palmata*. They were preceded by 12 lictors carrying the *fascæ* or bundles of sticks, in the middle of which appeared an axe. The axe, as being the characteristic rather of tyranny than of freedom, was taken away from the *fascæ* by Valerius Poplicola, but it was restored by his successor. They took it by turns monthly to be preceded by the lictors while at Rome, lest the appearance of two persons with the badges of royal authority should raise apprehensions in the multitude. While one appeared publicly in state, only a crier walked before the other, and the lictors followed behind without the *fascæ*. Their authority was equal; yet the Valerian law gave the right of priority to the older, and the Julian law to him who had most children; and he was generally called *consul major* or *prior*. As their power was absolute, they presided over the senate, and could convene and dismiss it at pleasure. The senators were their counsellors; and among the Romans the manner of reckoning their years was by the name of the consuls, and by *M. Tull. Cicerone et L. Antonio Consulibus*, for instance, the year of Rome 689 was always understood. This custom lasted from the year of Rome 244 till the 1294, or 541st year of the Christian era. In public assemblies the consuls sat in ivory chairs, and held in their hand an ivory wand called *scipio eburneus*, which had an eagle on its top as a sign of dignity and power. When they had drawn by lot the provinces over which they were to preside during their consulship, they went to the capitol to offer their prayers to the gods, and intreat them to protect the republic; after this they departed from the city arrayed in their military dress and preceded by the lictors. Sometimes the provinces were assigned them without drawing by lot, by the will and appointment of the senators. At their departure they were provided by the state with whatever was requisite during their expedition. In their provinces they were both attended by the 12 lictors, and equally invested with regal authority. They were not permitted to return to Rome without the special command of the senate; and they always remained in the province till the arrival of their successor. At their return they harangued the people, and

solemnly protested that they had done nothing against the laws or interest of their country, but had faithfully and diligently endeavoured to promote the greatness and welfare of the state. No man could be consul two following years; yet this institution was sometimes broken, and we find Marius re-elected consul after the expiration of his office during the Cimbrian war. The office of consul, so dignified during the times of the commonwealth, became a mere title under the emperors, and retained nothing of its authority but the useless ensigns of original dignity. Even the duration of the office, which was originally annual, was reduced to two or three months by J. Cæsar; but they who were admitted on the first of January denominated the year, and were called *ordinarii*. Their successors during the year were distinguished by the name of *suffecti*. Tiberius and Claudius abridged the time of the consulship; and the emperor Commodus made no less than 25 consuls in one year. Constantine the Great renewed the original institution, and permitted them to be a whole year in office.

CONSUL, at present, is an officer established by virtue of a commission from the king and other princes, in all foreign countries of any considerable trade, to facilitate and dispatch business, and protect the merchants of the nation. The consuls are to keep up a correspondence with the ministers of England residing in the courts whereon their consulate depends. They are to support the commerce and the interest of the nation; to dispose of the sums given and the presents made to the lords and principals of places, to obtain their protection, and prevent the insults of the natives on the merchants of the nation.

CONSUMMATION, the end, period, or completion of any work. Thus, we say, the *consummation* of all things, meaning the end the world. By the incarnation, all the prophecies are said to be *consummated*. See PROPHECY, and ACCOMPLISHMENT.

CONSUMMATION of Marriage, denotes the last act of marriage, which makes its accomplishment; or the most intimate union between the married pair, &c.

CONSUMPTION, in medicine, a word of very extensive signification, implies all disorders that bring any decay or waste upon the constitution; but is most commonly used for the *phthisis pulmonalis*. See MEDICINE-Index.

CONSUMPTION, in farriery. See FARRIERY, § viii.

CONSUS, the pagan god of counsel. He had an altar under ground in the great circus at Rome, to show that counsel ought to be kept secret. See CONSUALIA.

CONTACT, is when one line, plane, or body, is made to touch another; and the parts that do thus touch are called the *points* or *places of contact*.

CONTAGION, in phytic, the communicating a disease from one body to another. In some diseases it is only effected by an immediate contact or touch, as the venom of the pox; in others it is conveyed by infected clothes, as the itch; and in others it is supposed to be transmitted through the air at a considerable distance, by means of steams or effluvia expiring from the sick, as in the plague and other pestilential disorders, in which case the air is said to be contagious, though this has been disputed.

Contempla-
tion
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Continence.

CONTEMPLATION, an act of the mind, whereby it applies itself to consider and reflect upon the works of God, nature, &c.

CONTEMPORARY, or COTEMPORARY, a person or thing that existed in the same age with another. Thus, Socrates, Plato, and Aristophanes, were contemporaries.

CONTEMPT, in a general sense, the act of despising, or the state of being despised.

CONTEMPT, in law, is a disobedience to the rules and orders of a court, which hath power to punish such offence; and as this is sometimes a greater, and sometimes a lesser offence, so it is punished with greater or less punishment, by fine, and sometimes by imprisonment.

CONTENT, in geometry, the area or quantity of matter or space included in certain bounds.

CONTESSA, a port-town of Turkey in Europe, in the province of Macedonia, situated on a bay of the Archipelago, about 200 miles west of Constantinople. E. Long. 25. O. N. Lat. 41. O.

CONTEXT, among divines and critics, that part of scripture or other writing which lies about the text, before or after it, or both. To take the full and genuine sense of the text, the context should be regarded.

TEXTURE, a word frequently used in speaking both of the works of nature and art; and denoting the disposition and union of the constituent parts with respect to one another.

CONTI, a town of Picardy in France, with the title of a principality. It is seated on the river Seille, in E. Long. 2. 17. N. Lat. 49. 54.

CONTIGUITY, in geometry, is when the surface of one body touches that of another.

CONTIGUOUS, a relative term understood of things disposed so near each other, that they join their surfaces or touch. The houses in ancient Rome were not contiguous as ours are, but all insulated.

CONTINENCE, in ethics, a moral virtue, by which we resist concupiscence. It should seem that there is this distinction between chastity and continence, in that it requires no effort to be chaste, which results from constitution; whereas continence appears to be the consequence of a victory gained over ourselves. The verb *continere*, in the Latin, signifies "to restrain." The term, however, is most usually applied to men; as *chastity* is to women. See CHASTITY.

Continence is a virtue that makes but an inconsiderable figure in our days. However, we ought not to lose our ideas of things, though we have debauched our true relish in our practice: for, after all, solid virtue will keep its place in the opinion of the wise and sensible part of mankind. And though custom has not made it so scandalous as it ought to be to insuare innocent women, and triumph in the falsehood; such actions as we shall relate must be accounted true gallantry, and rise higher in our esteem the farther they are removed from our imitation.

1. Scipio the Younger, when only 24 years of age, was appointed by the Roman republic to the command of the army against the Spaniards. His wisdom and valour would have done honour to the most experienced general. Determined to strike an important blow, he forms a design of besieging Carthage, then the ca-

pital of the Cathaginian empire in Spain. His measures were so judiciously concerted, and with so much courage and intrepidity pursued, both by sea and land, that notwithstanding a bold and vigorous defence, the capital was taken by storm. The plunder was immense. Ten thousand free-men were made prisoners; and above 300 more, of both sexes, were received as hostages. One of the latter, a very ancient lady, the wife of Mandonius, brother of Indibilis king of the Illyrgetes, watching her opportunity, came out of the crowd, and, throwing herself at the conqueror's feet, conjured him, with tears in her eyes, to recommend to those who had the ladies in their keeping to have regard to their sex and birth. Scipio, who did not understand her meaning at first, assured her that he had given orders that they should not want for any thing. But the lady replied, "Those conveniences are not what affect us. In the condition to which fortune hath reduced us, with what ought we not to be contented? I have many other apprehensions, when I consider, on one side, the licentiousness of war; and, on the other, the youth and beauty of the princesses which you see here before us; for as to me, my age protects me from all fear in this respect." She had with her the daughters of Indibilis, and several other ladies of high rank, all in the flower of youth, who considered her as their mother. Scipio then comprehending what the subject of her fear was, "My own glory (says he), and that of the Roman people, are concerned in not suffering that virtue, which ought always to be respected wherever we find it, should be exposed in my camp to a treatment unworthy of it. But you give me a new motive for being more strict in my care of it, in the virtuous solicitude you show in thinking only of the preservation of your honour, in the midst of so many other objects of fear." After this conversation, he committed the care of the ladies to some officers of experienced prudence, strictly commanding that they should treat them with all the respect they could pay to the mothers, wives, and daughters, of their allies and particular friends. It was not long before Scipio's integrity and virtue were put to the trial. Being retired in his camp, some of his officers brought him a young virgin of such exquisite beauty, that she drew upon her the eyes and admiration of every body. The young conqueror started from his seat with confusion and surprize; and, like one thunder-struck, seemed to be robbed of that presence of mind and self-possession so necessary in a general, and for which Scipio was remarkably famous. In a few moments, having rallied his straggling spirits, he inquired of the beautiful captive, in the most civil and polite manner, concerning her country, birth, and connections; and finding that she was betrothed to a Celtiberian prince named Allucius, he ordered both him and the captive's parents to be sent for. The Spanish prince no sooner appeared in his presence, than, even before he spoke to the father and mother, he took him aside; and, to remove the anxiety he might be in on account of the young lady, he addressed him in these words: "You and I are young, which admits of my speaking to you with more liberty. Those who brought me your future spouse, assured me, at the same time, that you loved her with extreme tenderness; and her beauty left me no room to doubt it. Upon which

Livy, Val,
Maximus,
&c.

Continence reflecting, that if, like you, I had thought on making an engagement, and were not wholly engrossed with the affairs of my country, I should desire that so honourable and legitimate a passion should find favour, I think myself happy in the present conjuncture to do you this service. Though the fortune of war has made me your master, I desire to be your friend. Here is your wife: take her, and may the gods bless you with her. One thing, however, I would have you be fully assured of, that she has been amongst us as she would have been in the house of her father and mother. Far be it from Scipio to purchase a loose and momentary pleasure at the expence of virtue, honour, and the happiness of an honest man. No: I have kept her for you, in order to make you a present worthy of you and of me. The only gratitude I require of you for this inestimable gift is, that you would be a friend to the Roman people." Allucius's heart was too full to make him any answer; but throwing himself at the general's feet, he wept aloud. The captive lady fell into the same posture; and remained so, till the father burst out into the following words: "Oh! divine Scipio! the gods have given you more than human virtue! Oh! glorious leader! Oh! wondrous youth! does not that obliged virgin give you, while she prays to the gods for your prosperity, raptures above all the transports you could have reaped from the possession of her injured person?"

The relations of the young lady had brought with them a very considerable sum for her ransom: but when they saw that she was restored to them in so generous and godlike a manner, they intreated the conqueror, with great earnestness, to accept that sum as a present; and declared, by his complying, that new favour would complete their joy and gratitude. Scipio, not being able to resist such warm and earnest solicitations, told them that he accepted the gift, and ordered it to be laid at his feet: then addressing himself to Allucius, "I add (says he) to the portion which you are to receive from your father-in-law this sum; which I desire you to accept as a marriage-present."

If we consider that Scipio was at this time in the prime of life, unmarried, and under no restraint, we cannot but acknowledge, that the conquest he made of himself was far more glorious than that of the Carthaginian empire: and though his treatment of this captive prince was not more delicate and generous than what might justly be expected from a person endowed with reason and reflection; yet considering how few there are in his circumstances who would have acted as he did, we cannot but applaud his conduct, and propose him as a suitable example to future ages. Nor was his virtue unrewarded. The young prince, charmed with the liberality and politeness of Scipio, went into his country to publish the praises of so generous a victor. He cried out, in the transports of his gratitude, "That there was come into Spain a young hero like the gods; who conquered all things less by the force of his arms than the charms of his virtue and the greatness of his beneficence." Upon this report all Celtiberia submitted to the Romans; and Allucius returned in a shout to Scipio, at the head of 1400 chosen horse, to facilitate his future conquests. To render the marks of his gratitude still more durable, Allucius caused the action we have just related to be

engraven on a silver shield, which he presented to Scipio; *Continence* a present infinitely more estimable and glorious than all his treasures and triumphs. The buckler, which Scipio carried with him when he returned to Rome, was lost, in passing the Rhone, with part of the baggage. It continued in that river till the year 1665, when some fishermen found it. It is now in the king of France's cabinet.

2. The circumstance which raises Alexander the Great above many conquerors, and, as it were, above himself, is the use he made of his victory after the battle of Issus. This is the most beautiful incident in his life. It is the point of view in which it is his interest to be considered; and it is impossible for him not to appear truly great in that view. By the victory of Issus he became possessed of the whole Persian empire; not only Syfigambis, Darius's mother, was his captive, but also his wife and daughters, princesses whose beauty was not to be equalled in all Asia. Alexander, like Scipio, was in the bloom of life, a conqueror, free, and not yet engaged in matrimony: nevertheless, his camp was to those princesses a sacred asylum, or rather a temple, in which their chastity was secured as under the guard of virtue itself; and so highly revered, that Darius, in his expiring moments, hearing the kind treatment they had met with, could not help lifting up his dying hands towards heaven, and wishing success to so wise and generous a conqueror, who could govern his passions at so critical a time. Plutarch informs us more particularly, that the princesses lived so retired in the camp, according to their own desire, that they were not seen by any person except their own attendants; nor did any other person dare to approach their apartments. After the first visit, which was a respectful and ceremonious one, Alexander, to avoid exposing himself to the dangers of human frailty, made a solemn resolution never to visit Darius's queen any more. He himself informs us of this memorable circumstance, in a letter written by him to Parmenio, in which he commanded him to put to death certain Macedonians who had forced the wives of some foreign soldiers. In this letter was the following paragraph: "For as to myself, it will be found that I neither saw nor would see the wife of Darius; and did not suffer any one to speak of her beauty before me."

3. Isocrates informs us, that Nicocles, king of Salamin, gloried in never having known any woman besides his wife; and was amazed that all other contracts of civil society should be treated with due regard, whilst that of marriage, the most sacred and inviolable of obligations, was broken through with impunity; and that men should not blush to commit an infidelity with respect to their wives, of which, should their wives be guilty, it would throw them into the utmost anguish and fury.

4. Henry VI. king of England, though unhappy in his family and government, was nevertheless possessed of many virtues. He was so remarkable for his chastity, that before his marriage he would not allow any lady of a suspicious character and unguarded conduct to frequent the court: and having observed one day some ladies with their bosoms uncovered, he turned away his eyes from the indecent object, and reprimanded them smartly in the simple dialect of the times; *Rapine*

"Fy,

Continnence "Fy, fy (said he), for shame; forsooth ye be to blame."

Contingent

5. In the reign of King Charles II. when licentiousness was at its height in Britain, a yeoman of the guards refused the mistress of a king. The lady, who was dissatisfied with her royal lover, had fixed her eyes upon this man, and thought she had no more to do than speak her pleasure. He got out of her way. He refused to understand her; and when she pressed him further, he said, "I am married." The story reached the king, with all its circumstances: but they who expected an extravagant laugh upon the occasion were disappointed. He sent for the person: he found him a gentleman, though reduced to that mean station; and "Odds fish, man (says he), though I am not honest enough to be virtuous myself, I value them that are." He gave him an appointment, and respected him for life.

6. The extreme parts of Scotland, whose people we despise for their poverty, are honest in this respect to a wonder; and in the Swede's dominion, towards the pole, there is no name for adultery. They thought it an offence man could not commit against man; and have no word to express it in their language. The unpolished Lapland peasant, with these thoughts, is, as a human creature, much more respectable than the gay Briton, whose heart is stained with vices, and estranged from natural affection; and he is happier. The perfect confidence mutually reposed between him and the honest partner of his breast, entails a satisfaction even in the lowest poverty. It gilds the humble hearth, and lights the cabin; their homely meal is a sacrifice of thanks, and every breath of smoke arises in incense. If hand be laid upon hand, it is sure affection; and if some infant plays about their knees, they look upon him and upon each other with a delight that greatness seldom knows, because it feels distrust.

CONTINENT, in general, an appellation given to things continued without interruption; in which sense we say, *continent fever*, &c.

CONTINENT, in geography, a great extent of land not interrupted by seas, in contradistinction to island and peninsula, &c. See GEOGRAPHY.—Sicily is said to have been anciently torn from the continent of Italy; and it is an old tradition, which some of our antiquaries still have a regard to, that Britain was formerly a part of the continent of France.

The world is usually divided into two great continents, the old and the new. Whether there exists in the southern hemisphere another continent, or the whole be only an immense watery region, is a question that for near three centuries has engaged the attention of the learned as well as the commercial world, and given rise to many interesting voyages and discoveries; concerning which, see the article *SOUTH SEA*.

CONTINGENT, something casual or unusual. Hence future contingent, denotes a conditional event which may or may not happen, according as circumstances fall out.

CONTINGENT, is also a term of relation for the quota that falls to any person upon a division. Thus each prince of Germany in time of war is to furnish so

many men, so much money, and munition, for his contingent.

CONTINUED, or CONTINUAL, in a general sense, means incessant, or proceeding without interruption.

CONTINUED Fever, is such a one as sometimes remits, but never intermits or goes entirely off till its period.

CONTINUED Bass, in music, thus called, says Rousseau, because it is continued through the whole piece. Its principal use, besides that of regulating the harmony, is to support the voice and preserve the tone. They pretend that it was one Ludovico Viana, of whom a treatise still remains, who towards the end of the last century first put the continued bass in practice.

CONTINUED Proportion, in arithmetic, is that where the consequent of the first ratio is the same with the antecedent of the second; as $4:8::8:16$; in contradistinction to discrete proportion.

CONTINUITY, is defined by some schoolmen the immediate cohesion of parts in the same quantum; by others, a mode of body, whereby its extremities become one; and by others, a state of body resulting from the mutual implication of its parts. There are two kinds of continuity, mathematical and physical. The first is merely imaginary, since it supposes real or physical parts where there are none. The other, or physical continuity, is that state of two or more particles, in which their parts are so mutually implicated as to constitute one uninterrupted quantity or continuum.

CONTINUO, in music, signifies the thorough bass, as *basso continuo* is the continual or thorough bass, which is sometimes marked in music-books by the letters B. C.

CONTOBABBITES, a sect in the sixth century. Their first leader was Severus of Antioch; who was succeeded by John the grammarian surnamed Philoponus, and one Theodosius whose followers were also called *Theodosians*. Part of them, who were willing to receive a book composed by Theodosius on the Trinity, made a separate body, and were called *Contobabbites*, from some place, which Nicephorus does not mention, but which must apparently have been the place where they held their assemblies. The Contobabbites allowed of no bishops; which is the only circumstance given us concerning them.

CONTOR, CONDOR, or CUNDUR, the American name of a species of VULTUR.

CONTORSION, in general, signifies the action of twisting or wresting a member of the body out of its natural situation. Rope-dancers accustom themselves to contorsions of their limbs from their youth, to render the fibres of their articulations lax, and supple to all kinds of postures.

CONTORSION, in medicine, has many significations. 1. It denotes the iliac passion. 2. An incomplete dislocation, when a bone is in part, but not entirely, forced from its articulation. 3. A dislocation of the vertebræ of the back side-ways, or a crookedness of these vertebræ. And, 4. A disorder of the head, in which it is drawn towards one side, either by a spasmodic contraction of the muscles on the same side, or a palsy of the antagonist muscles on the other.

CONTORTÆ, the name of the 30th order in Linnaeus's

Contour ^{||}
Contract. ^{||}
naeus's Fragments of a natural method, consisting of plants which have a single petal that is twisted or bent to one side. This order contains the following genera, viz. echites, cerbera, gardenia, genipa, microcnemum, nerium, periploca, rawolfia, tabernæmontana, vinca, apocynum, asclepias, comeraria, ceropegia, cynanchum, plumeria, stapelia.

CONTOUR, in painting, the outline, or that which defines a figure.

A great part of the skill of the painter lies in managing the contours well. Contour, with the Italian painters, signifies the lineaments of the face.

CONTOURNE, in heraldry, is used when a beast is represented standing or running with its face to the sinister side of the escutcheon; they being always supposed to look to the right, if not otherwise expressed.

CONTOURNIATED, a term among antiquaries applied to medals, the edges of which appear as if turned in a lath. This sort of work seems to have had its origin in Greece; and to have been designed to perpetuate the memories of great men, particularly those who had bore away the prize at the solemn games. Such are those remaining of Homer, Solon, Euclid, Pythagoras, Socrates, and several athletes.

CONTRABAND, in commerce, a prohibited commodity, or merchandise bought or sold, imported or exported, in prejudice to the laws and ordinances of a state, or the public prohibitions of the sovereign. Contraband goods are not only liable to confiscation themselves, but also subject all other allowed merchandise found with them in the same box, bale, or parcel, together with the horses, waggons, &c. which conduct them. There are contrabands likewise, which, besides the forfeiture of the goods, are attended with several penalties and disabilities.

CONTRACT, in a general sense, a mutual consent of two or more parties, who voluntarily promise and oblige themselves to do something; pay a certain sum, or the like. All donations, exchanges, leases, &c. are so many different contracts.

CONTRACT is particularly used in common law, for an agreement or covenant between two, with a lawful consideration or cause. As, if I sell my horse for money; or covenant, in consideration of L. 20, to make you a lease of a farm; these are good contracts, because there is *quid pro quo*.

Usurious CONTRACT, is a contract to pay more interest for money than the laws allow. See **USURY**.

Those contracts are said to be *null* which the law prohibits the making of; such are all contracts between persons incapable of contracting; as minors, religious, lunatics, wives without consent of their husbands, &c.

CONTRACT is also used for the instrument in writing, which serves as a proof of the consent granted, and the obligation passed between the parties.

Among the ancient Romans, contracts, and all voluntary acts, were written, either by the parties themselves, or by one of the witnesses, or by a domestic secretary of one of the parties, whom they called a *notary*, but who was no public person as among us.

The contract, when finished, was carried to the magistrate, who gave it a public authority by receiving it *inter acta*, into the number of acts under his ju-

risdiction; giving each of the parties a copy thereof, transcribed by his clerks or domestic registers, and sealed with his seal. Which practice passed into France, where it obtained a long time.

CONTRACTILE FORCE, that property or power inherent in certain bodies, whereby, when extended, they are enabled to draw themselves up again to their former dimensions.

CONTRACTION, in physics, the diminishing the extent or dimensions of a body, or the causing its parts to approach nearer to each other; in which sense it stands opposed to dilatation or expansion.

CONTRACTION is frequently used by anatomical writers, to express the shrinking up of a fibre, or an assemblage of fibres, when extended.

Convulsions and spasms proceed from a preternatural contraction of the fibres of the muscles of the part convulsed. On the contrary, paralytic disorders generally proceed from a too great laxness of the fibres of the parts affected; or from the want of that degree of contraction necessary to perform the natural motion or action of the part. In the first, therefore, the animal spirits are supposed to flow, either in too great a quantity, or irregularly; and, in the last, the animal spirits are either denied a free passage into the part affected, or the tension of the fibrillæ is supposed insufficient to promote the circulation.

CONTRACTION, in grammar, is the reducing of two syllables into one, as *can't* for *cannot*, *should'st* for *shouldest*, &c.

CONTRADICTION, a species of direct opposition, wherein one thing is found diametrically opposite to another.

CONTRADICTORY PROPOSITIONS, are opposites, one of which imports a mere and naked denial of the other.

Seeming contradictories is when the members of a period quite disagree in appearance and sound, but perfectly agree and are consistent in sense: thus,

"Cowards die many times before their death:

"The valiant never taste of death but once."

SHAKESPEARE.

CONTRAFISSURE, in surgery, a kind of fracture, or fissure, in the cranium, which sometimes happens on the side opposite to that which received the blow, or at least, at some distance from it.

CONTRAINDICTION, in medicine, is an indication which forbids that to be done which the main scope of a disease points out.

Suppose, *e. gr.* in the cure of a disease a vomit were judged proper; if the patient be subject to a vomiting of blood, it is a sufficient contraindication as to its exhibition.

CONTRARIETY, an opposition between two things, which imports their being contrary to one another; and consists in this, that one of the terms implies a negation of the other, either mediately or immediately; so that contrariety may be said to be the contrast, or opposition of two things, one of which imports the absence of the other, as love and hatred.

CONTRAST; opposition or dissimilitude of figures, by which one contributes to the visibility or effect of the others. See **RESEMBLANCE**.

CONTRAST,

Contrast
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Controller.

CONTRAST, in painting and sculpture, expresses an opposition or difference of position, attitude, &c. of two or more figures, contrived to make variety in a painting, &c. as where, in a groupe of three figures, one is shown before, another behind, and another sideways, they are said to be in contrast.

The contrast is not only to be observed in the position of several figures, but also in that of the several members of the same figure: thus, if the right arm advance farthest, the right leg is to be hindermost; if the eye be directed one way, the arm to go the contrary way, &c. The contrast must be pursued even in the drapery.

CONTRAST, in architecture, is to avoid the repetition of the same thing, in order to please by variety.

CONTRATE-WHEEL, in watch-work, that next to the crown, the teeth and hoop whereof lie contrary to those of the other wheels, from whence it takes its name. See *WATCH-MAKING*.

CONTRAVALLATION, or the *Line CONTRAVALLATION*, in fortification, a trench guarded with a parapet, and usually cut round about a place by the besiegers, to secure themselves on that side, and to stop the sallies of the garrison. See *FORTIFICATION*.

CONTRAVENTION, in law, a man's failing to discharge his word, obligation, duty, or the laws or customs of the place.

CONTRAYERVA, in botany. See *DORSTENIA*.

CONTRE, in heraldry, an appellation given to several bearings, on account of their cutting the shield contrary and opposite ways: thus we meet with contre-bend, contre-chevron, contre-pale, &c. when there are two ordinaries of the same nature opposite to each other, so as colour may be opposed to metal, and metal to colour.

CONTRIBUTION, the payment of each person's quota of the part he is to bear in some imposition, or common expence. See *CONTINGENT*, &c.—Contributions are either involuntary, as those of taxes and imposts; or voluntary, as those of expences for carrying on some undertaking for the interest of the community.

CONTRIBUTIONS, in a military sense, are impositions paid by frontier countries to secure themselves from being plundered, and ruined by the enemy's army. The peasants till their ground under the faith of contributions, as securely as in time of profound peace.

CONTRITION, in theology, a sorrow for our sins, resulting from the reflection of having offended God, from the sole consideration of his goodness, without any regard to the punishment due to the trespass, and attended with a sincere resolution of reforming them. The word is derived from the Latin *conterere*, to break or bruise.

CONTROL is properly a double register kept of acts, issues, &c. of the officers or commissioners in the revenue, army, &c. in order to perceive the true state thereof, and to certify the truth, and the due keeping of the acts subject to the enregistrement.

CONTROLLER, an officer appointed to control or oversee the accounts of other officers; and, on oc-

casion, to certify whether or no things have been controlled or examined.

In Britain we have several officers of this name; as controller of the king's house, controller of the navy, controller of the customs, controller of the mint, &c.

CONTROLLER of the Hanaper, an officer that attends the lord chancellor daily, in term and in seal-time, to take all things sealed in leathern bags from the clerks of the hanaper, and to make the number and effect thereof, and enter them in a book, with all the duties belonging to the king and other officers for the same, and so charge the clerk of the hanaper with them.

CONTROLLER of the Household, the second officer under the lord steward. The name of his office comes from the French word *contrerouler*. His office is to control the accounts and reckonings of the Green Cloth, of which board he is always a member. He carries a white staff, and is always one of the privy-council. He has L. 107 : 17 : 6 a-year wages, and L. 1092 : 2 : 6 board-wages.

CONTROLLER of the Pipe, an officer of the exchequer, that makes out a summons twice every year, to levy the farms and debts of the pipe. See *PIPE* and *EX-CHEQUER*.

CONTROLLERS of the Pells, two officers of the exchequer, who are the chamberlain's clerks, and keep a control of the pell of receipts, and goings out.

CONTUMACY, in law, a refusal to appear in court when legally summoned, or the disobedience to the rules and orders of a court having power to punish such offence.

CONTUSION, in medicine and surgery, any hurt of the body that is inflicted by a blunt instrument. See *SURGERY*.

CONVALESCENCE, in medicine, the insensible recovery of health; or that state in which, after the cure of a disorder, the body which has been reduced, has not yet regained its vigour, but begins to resume its powers. Proper aliments conduce to the re-establishment of the languid faculties; but as the tone of the bowels is weakened, the digestive faculty is not equal to its office, which is shown by light sweats over the whole body; and the smallest excess in this respect is oftentimes the occasion of dangerous relapses. A person in this state is like a taper relumined, which the least degree of wind is sufficient to extinguish.

CONVALLARIA, or *Lily of the Valley*, in botany, a genus of the monogynia order, belonging to the hexandria class of plants; and in the natural method ranking under *Sarmentaceae*, or 11th order. The corolla is sexfid; the berry spotted and trilocular. The species are eight, three of which are natives of Britain, viz. the maialis, or may-lily; the multiflora, or solomon's-seal; and the polygonatum, or sweet-smelling solomon's-seal. They are plants of considerable beauty, and may easily be propagated by their creeping roots.

CONVENARUM VRBS, or *Lugdunum*, (anc. geog.) a town of the Convenae, a people of Gallia Narbonensis, at the feet of the Pyrenees. Its origin was owing to the Sertorian war, Pompey compelling the robbers of the Pyrenees and fugitive slaves to settle

Controller
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Convenarum

Conven-
ticle
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Conven-
tual.

tle there, (Pliny). It stood near the head of the Garonne. Now St Bertrand, in Gascony. E. Long. 30'. Lat. 43° 15'.

CONVENTICLE, a diminutive of convent; denoting, properly, a cabal, or secret assembly, of a part of the monks of a convent, to make a brigade or party in the election of an abbot. From the ill use of these assemblies, the word is come into disrepute; and now stands for any mischievous, seditious, or irregular assembly. F. Doucine observes, the occidentals always esteemed the fifth general council an unlawful conventicle.

The term conventicle is said, by some, to have been first applied in England to the schools of Wickliff, and has been since used to signify the religious assemblies of all in that country who do not conform to the established doctrines and worship of the church of England.

By 22 Car. II. cap. 1. it is enacted, That if any persons of the age of 16 years, subjects of this kingdom, shall be present at any conventicle, where there are five or more assembled, they shall be fined 5s. for the first offence, and 10s. for the second: and persons preaching incur a penalty of L. 20. Also suffering a meeting to be held in a house, &c. is liable to L. 20 penalty. Justices of peace have power to enter such houses, and seize persons assembled, &c. And if they neglect their duty, they shall forfeit L. 100. And if any constable, &c. know of such meetings, and do not inform a justice of peace, or chief magistrate, &c. he shall forfeit L. 5. But the 1st W. and M. cap. 18. ordains, that protestant dissenters shall be exempt from penalties: though, if they meet in a house with the doors locked, barred, or bolted, such dissenters shall have no benefit from 1 W. and M. Officers of the government, &c. present at any conventicle, at which there shall be ten persons, if the royal family be not prayed for in express words, shall forfeit L. 40 and be disabled: (Stat. 10 Anne, cap. 2.)

CONVENTION, a treaty, contract, or agreement between two or more parties.

CONVENTION is also a name given to an extraordinary assembly of parliament, or the estates of the realm, held without the king's writ. Of this kind was the convention parliament which restored Charles II. This parliament met above a month before his return, and sat full seven months after his restoration, and enacted several laws still in force, which were confirmed by stat. 13 Car. II. c. 7. and c. 14. Such also was the convention of estates in 1688, who, upon the retreat of king James II. came to a conclusion that he had abdicated the throne, and that the right of succession devolved to king William and queen Mary; whereupon their assembly expired as a convention, and was converted into a parliament.

CONVENTION of Estates, in Scotland, was partly of the nature of a parliament; but differing in this, that the former could only lay on taxes, while parliament could both impose taxes and make laws.

CONVENTUAL, something belonging to a convent or monastery. See **MONASTERY**, and **COENOBITE**.

CONVENTUAL is particularly used for a religious who actually resides in a convent; in contradistinction to those who are only guests, or are entertained there,

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or in possession of benefices depending on the house. **Conventus** || **Conve-**
See **MONK**. **tion.**

CONVENTUS JURIDICI, were courts of justice established in the Roman provinces; with a resort or extent of jurisdiction, circumscribed and confined within certain limits of district, whither all who were of the resort were to repair for justice. The unreasonable affectation of changing forms of war into forms of civil courts, proved the ruin of Varus and of three legions in Germany, (Florus). *Conventum agere*, is to hold a court of justice.

CONVERGING or **CONVERGENT Lines**, in geometry, are such as continually approach nearer one another, or whose distances become still less and less. These are opposed to divergent lines, the distances of which become continually greater: those lines which converge one way, diverge the other.

CONVERGING Rays, in optics, those rays that, issuing from divers points of an object, incline towards another, till at last they meet and cross, and then become diverging rays.

CONVERSATION, or **DISCOURSE**, signifies an interlocution between two, or among more persons: with this distinction, that conversation is used for any general intercourse of sentiments whatever, whereas a discourse means a conversation limited to some particular subject.

There is no part, perhaps, of social life which affords more real satisfaction than those hours which one passes in rational and unreserved conversation. That conversation, however, may answer the ends for which it was designed, the parties who are to join in it must come together with a determined resolution to please, and to be pleased.

In the conduct of it, be not eager to interrupt others, or uneasy at being yourself interrupted; since you speak either to amuse or instruct the company, or to receive those benefits from it. Give all, therefore, leave to speak in turn. Hear with patience, and answer with precision. Inattention is ill manners; it shows contempt; and contempt is never forgiven.

Trouble not the company with your own private concerns, as you do not love to be troubled with those of others. Yours are as little to them as theirs are to you. You will need no other rule whereby to judge of this matter.

Contrive, but with dexterity and propriety, that each person may have an opportunity of discoursing on the subject with which he is best acquainted. He will be pleased, and you will be informed. By observing this rule, every one has it in his power to assist in rendering conversation agreeable; since, though he may not choose, or be qualified, to say much himself, he can propose questions to those who are able to answer them.

Avoid stories, unless short, pointed, and quite *a-propos*. He who deals in them, says Swift, must either have a very large stock, or a good memory, or must often change his company. Some have a set of them strung together like onions; they take possession of the conversation by an early introduction of one, and then you must have the whole rope; and there is an end of every thing else, perhaps, for that meeting, though you may have heard all twenty times before.

Talk often, but not long. The talent of haranguing

Conversa-
tion
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Convert.

ing private company is insupportable. Senators and barristers are apt to be guilty of this fault; and members who never harangue in the house, will often do it out of the house. If the majority of the company be naturally silent, or cautious, the conversation will flag, unless it be often renewed by one among them who can start new subjects. Forbear, however, if possible, to broach a second before the first is out, lest your stock should not last, and you should be obliged to come back to the old barrel. There are those who will repeatedly cross upon and break into the conversation with a fresh topic, till they have touched upon all, and exhausted none. Economy here is necessary for most people.

Laugh not at your own wit and humour; leave that to the company.

When the conversation is flowing in a serious and useful channel, never interrupt it by an ill-timed jest. The stream is scattered, and cannot be again collected.

Discourse not in a whisper, or half-voice, to your next neighbour. It is ill-breeding, and, in some degree, a fraud; conversation-stock being, as one has well observed, a joint and common property.

In reflections on absent people, go no farther than you would go if they were present. "I resolve (says bishop Beveridge) never to speak of a man's virtues to his face, nor of his faults behind his back:"—A golden rule! the observation of which would, at one stroke, banish flattery and defamation from the earth.

CONVERSE, in mathematics. One proposition is called the *converse* of another, when, after a conclusion is drawn from something supposed in the converse proposition, that conclusion is supposed; and then, that which in the other was supposed, is now drawn as a conclusion from it: thus, when two sides of a triangle are equal, the angles under these sides are equal; and, on the converse, if these angles are equal, the two sides are equal.

CONVERSION, in a moral sense, implies a repentance for a temper and conduct unworthy our nature, and unbecoming our obligations to its Author, and a resolution to act a wiser and a better part for the future.

CONVERSION, in war, a military motion, whereby the front of a battalion is turned where the flank was, in case the battalion is attacked in the flank.

CONVERSION of Equations, the same with reduction of equations by multiplication. See ALGEBRA.

CONVERT, a person who has undergone a conversion.

CONVERT is chiefly used in respect of changes from one religion, or religious sect, to another. Converts with relation to the religion turned to, are denominated *apostates* with regard to that they have relinquished.

The Jews formerly converted to Christianity in England, were called *conversos*. Henry III. built them a house in London, and allowed them a competent subsistence for their lives; which house was called *domus conversorum*. But the number afterwards increasing, they grew a burden to the crown; upon which they were distributed among the monasteries: and after the expulsion of the Jews under Edward III. the *domus conversorum* was given for keeping of the rolls.

CONVERTS, in a monastic sense, are lay-friars, or brothers, admitted for the service of the house; without orders, and not allowed to sing in the choir. Till the eleventh century, the word was used for persons who embraced the monkish life at the age of discretion; by which they were distinguished from those devoted in their childhood by their parents, called *oblats*. But in the eleventh century, when they began to receive into monasteries illiterate persons, incapable of being clerks, and only destined for bodily labour, the signification of the word was necessarily changed. F. Mabillon observes, that it was John first abbot of Vallombrosa who first introduced these brother-converts, distinguished by their state from the monks of the choir, who were then either clerks or capable of becoming so.

CONVEX, an appellation given to the exterior surface of gibbous or globular bodies; in opposition to the hollow inner surface of such bodies, which is called *concave*; thus we say, a convex frieze, lens, mirror, superficies, &c.

CONVEXITY, the exterior surface of a convex, *i. e.* gibbous and globular thing; in opposition to concavity, or the inner surface, which is hollow or depressed. See CONCAVE.

The word is of particular import in catoptrics and dioptrics; where it is applied to mirrors and lenses.

A convex mirror represents its images smaller than the objects; as a concave one represents them larger: a convex mirror reflects the rays from it, diverging; and therefore disperses and weakens their effect: as a concave one reflects them converging; so as they concur in a point, and have their effect increased: and by how much the mirror is a portion of a smaller sphere, by so much does it diminish the objects, and disperse the rays the more. See MIRROR.

A convex lens is either convex on both sides, called a *convexo-convex*; or it is plain on one side and convex on the other, called a *plano-convex*; or concave on one side and convex on the other, called a *convexo-concave*, or *concavo-convex*, as the one or the other surface prevails, *i. e.* as this or that is a portion of a smaller sphere. All convex lenses inflect the rays of light in their passage, *i. e.* send them out from their convex surface converging, so as that they concur in a point or focus. Hence all convex lenses magnify, *i. e.* represent their images larger than their objects; and this the more as they are portions of smaller spheres.

CONVEYANCE, in law, a deed or instrument that passes land, &c. from one person to another.

CONVICT, in common law, a person that is found guilty of an offence by the verdict of a jury. See the following article.

CONVICTION, in law. When a jury has given a verdict upon trial, finding the prisoner guilty, he is said to be *convicted* of the crime whereof he stands indicted. See TRIAL.

When the offender is thus convicted, there are two collateral circumstances that immediately arise. 1. On a conviction in general for any felony, the reasonable expences of prosecution are by statute 25 Geo. II. c. 36. to be allowed the prosecutor out of the county-stock, if he petitions the judge for that purpose; and by statute 27 Geo. II. c. 3. poor persons, bound over

Converts
||
Conviction.

Conviction. to give evidence, are likewise intitled to be paid their charges, as well without conviction as with it. 2. On a conviction of larciny in particular, the prosecutor shall have restitution of his goods by virtue of the statute 21 Hen. VIII. c. 11. For by the common law there was no restitution of goods upon an indictment; because it is at the suit of the king only; and therefore the party was enforced to bring an appeal of robbery, in order to have his goods again. But, it being considered that the party prosecuting the offender by indictment, deserves to the full as much encouragement as he who prosecutes by appeal, this statute was made, which enacts, that if any person be convicted of larciny by the evidence of the party robbed, he shall have full restitution of his money, goods, and chattels, or the value of them out of the offender's goods, if he has any, by a writ to be granted by the justices. And the construction of this act having been in great measure conformable to the law of appeals, it has therefore in practice superseded the use of appeals of larciny. For instance, as formerly upon appeals, so now upon indictments of larciny, this writ of restitution shall reach the goods so stolen, notwithstanding the property of them is endeavoured to be altered by sale in market overt. And though this may seem somewhat hard upon the buyer, yet the rule of law is, that *spoliatus debet ante omnia restitui*, especially when he has used all the diligence in his power to convict the felon. And, since the case is reduced to this hard necessity, that either the owner or the buyer must suffer; the law prefers the right of the owner, who has done a meritorious act by pursuing a felon to condign punishment, to the right of the buyer, whose merit is only negative, that he has been guilty of no unfair transaction. And it is now usual for the court, upon the conviction of a felon, to order, without any writ, immediate restitution of such goods as are brought into court, to be made to the several prosecutors. Or else, secondly, without such writ of restitution, the party may peaceably retake his goods wherever he happens to find them, unless a new property be fairly acquired therein. Or, lastly, if the felon be convicted and pardoned, or be allowed his clergy, the party robbed may bring his action of trover against him for his goods, and recover a satisfaction in damages. But such action lies not before prosecution; for so felonies would be made up and healed: and also recaption is unlawful, if it be done with intention to smother and compound the larciny; it then becoming the heinous offence of *theft-bote*.

It is not uncommon, when a person is convicted of a misdemeanour, which principally and more immediately affects some individual, as a battery, imprisonment, or the like, for the court to permit the defendant to *speake with the prosecutor*, before any judgement is pronounced; and if the prosecutor declares himself satisfied, to inflict but a trivial punishment. This is done to reimburse the prosecutor his expences, and make him some private amends, without the trouble and circuitry of a civil action. But it is surely a dangerous practice: and, though it may be entrusted to the prudence and discretion of the judges in the superior courts of record, it ought never to be allowed in local or inferior jurisdictions, such as the quarter-sessions: where prosecutions for assaults are by

this means too frequently commenced, rather for private lucre than for the great ends of public justice. Above all, it should never be suffered, where the testimony of the prosecutor himself is necessary to convict the defendant: for by this means the rules of evidence are entirely subverted; the prosecutor becomes in effect a plaintiff, and yet is suffered to bear witness for himself. Nay, even a voluntary forgiveness by the party injured, ought not, in true policy, to intercept the stroke of justice. "This (says an elegant writer who pleads with equal strength for the *certainly*, as for the lenity of punishment), may be an act of good nature and humanity, but it is contrary to the good of the public. For although a private citizen may dispense with satisfaction for his private injury, he cannot remove the necessity of public example. The right of punishing belongs not to any one individual in particular, but to the society in general, or to the sovereign who represents that society; and a man may renounce his own portion of this right, but he cannot give up that of others."

CONVICTION, in theology, expresses the first degree of repentance, wherein the sinner becomes sensible of his guilt, of the evil nature of sin, and of the danger of his own ways.

CONVOCATION, an assembly of the clergy of England, by their representatives, to consult of ecclesiastical matters. It is held during the session of parliament, and consists of an upper and a lower house. In the upper sit the bishops, and in the lower the inferior clergy, who are represented by their proctors; consisting of all the deans and archdeacons, of one proctor for every chapter, and two for the clergy of every diocese, in all 143 divines; viz. 22 deans, 53 archdeacons, 24 prebendaries, and 44 proctors of the diocesan clergy. The lower house chooses its prolocutor; whose business it is to take care that the members attend, to collect their debates and votes, and to carry their resolutions to the upper house. The convocation is summoned by the king's writ, directed to the archbishop of each province, requiring him to summon all bishops, deans, archdeacons, &c.

The power of the convocation is limited by a statute of Henry VIII. They are not to make any canons or ecclesiastical laws without the king's licence; nor, when permitted to make any, can they put them in execution, but under several restrictions. They have the examining and censuring all heretical and schismatical books and persons, &c. but there lies an appeal to the king in chancery, or to his delegates. The clergy in convocation, and their servants, have the same privileges as members of parliament.

Since the year 1665, when the convocation of the clergy gave up the privilege of taxing themselves to the house of commons, they seldom have been allowed to do any business; and are generally prorogued from time to time till dissolved, a new one being generally called along with a new parliament. The only equivalent for giving up the privilege of taxing themselves, was their being allowed to vote at elections for members to the house of commons, which they had not before.

CONVOLUTION, a winding motion, proper to the trunks of some plants, as the convolvulus, or bindweed; the claspers of vines, bryony, &c.

Convolvulus.

CONVOLVULUS, BIND-WEED: A genus of the pentandria order, belonging to the monogynia class of plants; and in the natural method ranking under the 29th order, *Campanaceæ*. The corolla is campanulated and plaited; there are two stigmata; the capsule is bilocular, and the cells are dispermous. Of this genus there is a great number of species; the most remarkable of which are the following.

1. The sepium, or large white bind-weed, is often a troublesome weed in gardens, when its roots are interwoven with those of trees and shrubs, or under hedges, as every small piece of root is apt to grow. It flourishes under moist hedges, and hath white or purplish blossoms. 2. The scammonia, or Syrian bind-weed, grows naturally in Syria. The roots are thick, run deep into the ground, and are covered with a dark bark. The branches extend on every side to the distance of 10 or 12 feet: they are slender, and trail on the ground, and are garnished with narrow, arrow-pointed leaves. The flowers are of a pale yellow, and come out from the side of the branches, two sitting upon each long footstalk: these are succeeded by roundish seed-vessels, having three cells filled with seeds. 3. The purpureus, or convolvulus major, is an annual plant growing naturally in Asia and America, but has been long cultivated in the British gardens. If these plants are properly supported, they will rise 10 or 12 feet high in warm summers. There are three or four lasting varieties: the most common hath a purple flower: the others have a white, a red, or a whitish-blue flower, which last hath white seeds. They flower in June, July, and August, and their seeds ripen in autumn. 4. The nil, or blue bind-weed, rises with a twining stalk 8 or 10 feet high, garnished with heart-shaped leaves, divided into three lobes, which end in sharp points. These are woolly, and stand upon long foot-stalks. The flowers also come out on long foot-stalks, each sustaining two flowers of a very deep blue colour, whence their name of anil or indigo. This is one of the most beautiful plants of the genus: it flowers all the latter part of the summer: and in good seasons the seeds ripen very well in the open air. 5. The battatas, or Spanish potatoes, hath esculent roots, which are annually imported from Spain and Portugal, where they are greatly cultivated for the table; but they are too tender to thrive in the open air in Britain. Their roots are like the common potato, but require much more room: for they send out many trailing stalks, which extend six or eight feet every way; and at their joints send out roots which in warm countries grow to be very large bulbs; so that from a single root planted 40 or 50 large potatoes are produced. 6. The canariensis, with soft woolly leaves, is a native of the Canaries; but hath long been preserved in the British gardens. It hath a strong fibrous root, from whence arise several twining woody stalks, which, where they have support, will grow more than 20 feet high, garnished with oblong heart-shaped leaves, which are soft and hairy. The flowers are produced from the wings of the leaves, several standing upon one footstalk. They are for the most part of a pale blue; but there is a variety with white flowers. They appear in June, July, and August, and sometimes ripen seeds here. 7. The tricolor, or convolvulus minor, is a native of Portugal; but hath long been

cultivated in the gardens of this country. It is an annual plant, which hath several thick herbaceous stalks growing about two feet long, which do not twine like the other sorts, but decline towards the ground, upon which many of the lower branches lie prostrate: they are garnished with spear-shaped leaves, which sit close to the branches: the footstalks of the flowers come out just above the leaves of the same joint, and at the same side of the stalks. They are about two inches long, each sustaining one large open bell-shaped flower, which, in some, is of a fine blue colour with a white bottom; in others they are pure white, and some are beautifully variegated with both colours. The white flowers are succeeded by white seeds, and the blue by dark-coloured seeds: which difference is pretty constant. 8. The soldanella, or sea-bindweed, styled also *brassica marina*, grows naturally on the sea-beaches in many parts of England, but cannot be long preserved in gardens. It hath many small white stringy roots, which spread wide and send out several weak trailing branches. These twine about the neighbouring plants like those of the common bindweed, garnished with kidney-shaped leaves like those of the lesser celandine. The flowers are produced on the side of the branches at each joint. They are of a reddish purple colour, and appear in July. They are succeeded by round capsules, having three cells, each containing one black seed. 9. The turpethum is a native of the island of Ceylon. This hath fleshy thick roots which spread far in the ground, and abound with a milky juice that flows out when the roots are broken or wounded, and soon hardens into a resinous substance when exposed to the sun and air. From the root shoot forth many twining branches, which twist about each other, or the neighbouring plants, like the common bindweed. They are garnished with heart-shaped leaves that are soft to the touch, like those of the marshmallow. The flowers are produced at the joints on the side of the stalks, several standing together on the same footstalk; they are white, and shaped like those of the common great bindweed, and are succeeded by round capsules, having three cells containing two seeds each. 10. The jalappa, or jalap, used in medicine, is a native of Haleppo in Spanish America, situated between La Vera Cruz and Mexico. It hath a large root of an oval form, which is full of a milky juice; from which come out many herbaceous twining stalks rising eight or ten feet high, garnished with variable leaves; some of them being heart-shaped, others angular, and some oblong and pointed. They are smooth, and stand upon long footstalks: the flowers are shaped like those of the common greater bindweed, each footstalk supporting only one flower.

Culture. The first and second sorts are propagated by seeds, which must be sown on a border of light earth. The second sort must have some tall stakes placed near them for their branches to twine about, otherwise they will spread on the ground and make a bad appearance. The third sort is annual, and must be propagated by seeds sown on a hot-bed in the spring, and towards the end of May they should be planted out in warm borders, and treated in the same manner with the former. The fourth species is sometimes propagated in this country. The roots must be planted on a hot-bed in the spring; and if the plants

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are covered in bad weather with glasses, they will produce flowers and some small bulbs from the joints of the stalks: but if they are exposed to the open air, they seldom grow to any size. The fifth is propagated by laying down the young shoots in the spring, which generally put out roots in three or four months: they may then be taken from the old plants, and each placed in a separate pot, which is to be set in the shade till they have taken new root; after which they may be placed with other hardy green-house plants till autumn, when they should be removed into the green-house, and afterwards treated in the same manner as myrtles and other green-house plants. The turbith and jalap are too tender to live in this country, unless they are constantly kept in a stove. The other species require no particular directions for their cultivation.

Uses. The root of the first sort is a very acrid purgative to the human race, but is eaten by hogs in large quantities without any detriment. The inspissated juice of the second species is used in medicine as a strong purgative; as are also the roots of the jalappa and turpethum. The soldanella has likewise been used with the same intention. Half an ounce of the juice, or a drachm of the powder, is an acrid purge. The leaves applied externally are said to diminish dropical swellings of the feet. See SCAMMONY, JALAP, and TURPETH.

CONVOY, in naval affairs, one or more ships of war, employed to accompany and protect merchant ships, and prevent their being insulted by pirates, or the enemies of the state in time of war.

CONVOY, in military matters, a body of men that guard any supply of men, money, ammunition, or provisions, conveyed by land into a town, army, or the like, in time of war.

CONUS, a cone, in botany: a species of fruit or scaly seed-vessel, so termed by Tournefort and other botanists. Linnæus has substituted STROBILUS in its place.

CONVULSION, a preternatural and violent contraction of the membranous and muscular parts of the body. See (the *Index* subjoined to) MEDICINE.

CONWAY, a market-town of Caernarvonshire in North Wales, situated near the mouth of a river of the same name, 15 miles west of St Asaph. W. Long. 3. 50. N. Lat. 53. 20.

CONYZA, FLEABANE: A genus of the polygamia superflua order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The pappus is simple, the calyx imbricated and roundish, the corollulæ of the radius trifid. There are 19 species, none of which merit any particular description.

CONZA, a town of the kingdom of Naples in Italy, situated on the farther principate, on the river Ofanto, 50 miles south-east of the city of Naples. E. Long. 16. 0. N. Lat. 41. 0. It is the see of an archbishop.

COOK (Sir Anthony), descended from Sir Thomas Cook lord mayor of London, was born in 1506, and supposed to have been educated at Cambridge. He was so eminent for his learning, piety, and prudence, that the guardians of king Edward VI. appointed him

to be his chief instructor in learning, and to form his manners. He had four daughters; and being resolved to have sons by education, lest he should have none by birth, he taught his daughters those lessons by night that he had instilled into the prince by day: he was happy in his endeavours, as they proved learned in Greek and Latin, and equally distinguished by virtue, piety, and good fortune. Mildred was married to the great lord Burleigh; Ann to Sir Nicholas Bacon, lord keeper of the great seal; Elisabeth to Sir John Russel, son and heir of Francis earl of Bedford; and Catharine to Sir Henry Killigrew. He lived in exile during the Marian persecution; and returning on the accession of queen Elizabeth, spent the rest of his days in peace and honour, dying in 1576.

COOK (Captain James), one of the most celebrated navigators ever produced by Britain or any other country, was the son of James Cook, supposed to have been a native of the county of Northumberland. His station was no higher than that of a servant in husbandry, and he was married to a woman in his own sphere of life at Morton, a village in the North riding of Yorkshire. From this place they removed to another village in the same riding named *Marton*, where Captain Cook was born on the 27th of October 1728. He was one of nine children, all of whom are now dead except a daughter, who married a fisherman of Redcar. He received the first rudiments of education from the schoolmistress of the village; and afterwards, on his father's removal to Great Ayton, he was put to a day-school, at the expence of Mr Skottow, his father's employer, where he was instructed in writing and in a few of the first rules of arithmetic. Before the age of thirteen he was bound apprentice to Mr W. Sanderfon, a haberdasher or shopkeeper at Straiths, about ten miles from Whitby: but some disagreement taking place between him and his master, he indulged his own inclination in binding himself apprentice to Messrs Walkers of Whitby, who had several vessels in the coal trade; and after serving a few years longer in the situation of a common sailor, he was at length raised to be mate of one of Mr Walker's ships. During all this period it is not recollected that he exhibited any thing peculiar either in his abilities or conduct.

Early in the year 1755, when hostilities broke out between France and England, Cook entered on board the *Eagle* of sixty guns, to which vessel Sir Hugh Palliser was soon after appointed, who soon distinguished him as an active and diligent seaman; and his promotion was forwarded by a letter of recommendation which was written by Mr Osbaldeston, member for Scarborough, at the request of several neighbours, in Mr Cook's favour. On the 15th of May 1759, he was appointed master of the *Mercury*, which soon after sailed to America, and joined the fleet under Sir Charles Saunders at the memorable siege of Quebec. His interest with the admiralty appears even then to have been very strong; for on Mr Osbaldeston's letter he was appointed master of the *Grampus* sloop; but the proper master having unexpectedly returned to her, the appointment did not take place. Four days after he was made master of the *Garland*; when upon inquiry it was found that he could not join her, as the vessel

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Cook. vessel had already failed; and the next day, May 15th 1759, he was made master of the *Mercury*. On this occasion he was recommended by Captain Palliser to a difficult and dangerous service, viz. to take the soundings of the river St Lawrence, between the island of Orleans and the north shore, which he performed in the most complete manner; and soon afterwards he was employed to survey the most dangerous parts of the river below Quebec: these were his first efforts with the pencil. After this expedition he was appointed, on the 22d of September, master of the *Northumberland*, stationed at Halifax, where he first read Euclid, and applied to astronomy and other branches of science. In the year 1762 he was with the *Northumberland*, assisting at the recapture of Newfoundland; and in the latter end of the same year he returned to England, and married, at Barking in Essex, Miss Elizabeth Batts. Early in 1763, when admiral (then Captain) Greaves was appointed governor of Newfoundland, Mr Cook went out with him to survey the coasts of that island. At the end of the season he returned to England; but in the beginning of 1764, Sir Hugh Palliser being appointed governor of Newfoundland and Labradore, Mr Cook accompanied him in the same capacity of surveyor, and had the *Grenville* schooner to attend him on that business: in this situation he continued till 1767.

While Mr Cook remained on this station, he had an opportunity of exhibiting publicly a specimen of his progress in the study of astronomy, by a short paper printed in the 57th volume of the *Philosophical Transactions*, intitled "An observation of an eclipse of the sun at the island of Newfoundland, August 5. 1766, with the longitude of the place of observation deduced from it." Mr Cook's observation was made at one of the Burgeo islands near Cape Ray, in N. Lat. $47^{\circ} 56' 19''$; and by the comparisons of it made by Mr Mitchel, with an observation of Dr Hornsby at Oxford, it appeared to have been accurately done: and Mr Cook at that time obtained the character of an able astronomer.

In the mean time a spirit for geographical discoveries, which had gradually declined since the beginning of the 17th century, began to discover itself anew. Two voyages of this kind had been performed in the reign of George II. the one under Captain Middleton, the other by Captains Moore and Smyth, with a view to discover a northwest passage through Hudson's Bay to the East Indies. Two others, under Captains Byron, Wallis, and Carteret, had been undertaken soon after the conclusion of the peace in 1763 by order of his present Majesty; and before the return of these navigators, who were ordered to sail round the world, another voyage was resolved upon for astronomical purposes. It having been calculated that a transit of Venus over the sun's disk would happen in 1769, a long memorial to his Majesty was presented by the Royal Society; in which they set forth the great importance of making proper observations on this phenomenon, the regard that had been paid to it by the different courts of Europe; and intreating, among other things, that a vessel might be fitted out, at the expence of government, for conveying proper persons to some of the Friendly Islands, in order to make the necessary observations. This being complied with on the part of his Majesty,

Alexander Dalrymple, Esq; an eminent member of the Royal Society, was appointed to take the command of the bark appropriated for the purpose. In the execution of the project, however, an unexpected difficulty occurred. Mr Dalrymple, sensible of the impossibility of guiding a vessel through unknown and dangerous seas without any proper command over the crew, demanded a brevet commission as captain of the vessel, in the same manner as had formerly been granted to Dr Halley in a voyage of discovery made by him. This commission Sir Edward Hawke absolutely refused to sign; declaring, when pressed upon the subject, that he would rather suffer his right hand to be cut off than trust any of his Majesty's ships to a person who had not been properly bred to the service; and in this proceeding he seemed to be justified by the mutinous behaviour of Dr Halley's crew; who, denying the legality of his authority over them, had involved him in a very disagreeable dispute, and which was attended with pernicious consequences. Mr Dalrymple, on the other hand, being equally determined in his refusal to proceed without the authority in question, there was a necessity for finding out some person of science who might also be free from the objection made by Sir Edward Hawke. Mr Cook therefore was proposed by Mr Stephens; and his recommendation being seconded by Sir Hugh Palliser, he was immediately appointed to direct the expedition; and on this occasion was promoted to the rank of lieutenant in his Majesty's service.

Mr Cook's commission as lieutenant was dated May 25. 1786; a vessel of 370 tons, named the *Endeavour*, was provided for him; and while the necessary preparations were making for the voyage, Captain Wallis returned. It having been recommended to this gentleman to fix upon a proper place for making the astronomical observations, he had accordingly chosen the island named by him *George's Island*, but since known by the name of *Otaheite*; judging also that Port Royal harbour in it would afford an eligible situation. This proposal being accepted, directions for the purpose were accordingly given to Mr Cook, with whom Mr Charles Green was joined in the astronomical part; the latter having been assistant to Dr Bradley in the Royal Observatory at Greenwich, and thus judged to be every way qualified for the office. The lieutenant was likewise accompanied by Mr Banks, now Sir Joseph Banks, Dr Solander, &c. The principal design of the voyage was, as has already been hinted, to make observations on the transit of Venus; but this being done, Mr Cook was directed to make further discoveries in the Pacific Ocean; and on the 30th of July 1768 he set sail on his expedition. An account of the voyage, and the discoveries made during the time of it, is given in the next article; here it is sufficient to observe, that throughout the whole Mr Cook approved himself an able seaman; and from his behaviour both to his own people and to the savage nations he occasionally met with, showed a most exact regard to the rules both of justice and humanity. On his first arrival at Otaheite, the following regulations were drawn up for his people, which he took care should be punctually obeyed: 1. To endeavour, by every fair means, to cultivate a friendship with the natives, and to treat them with all imaginable humanity. 2. A proper person or persons

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to be appointed to treat with the natives for provisions, fruits, &c. and no other person belonging to the ship to do so without leave. 3. Every person on shore to attend punctually to his duty, and to pay proper attention to his tools or arms; and if lost through negligence, to have the full value charged against his pay, with such farther punishment inflicted as occasion might require. 4. The same penalty to be inflicted on every one who should embezzle, trade with, or offer to trade with, any part of the ship's stores; and, 5. No iron to be given in exchange for any thing but provisions. His rigid adherence to these rules was manifested in several instances, particularly by severely punishing the ship's butcher, who had threatened the life of a woman, wife to one of the chiefs of the island, for refusing a stone hatchet on the terms he proposed. On erecting their observatory, in order to go through the astronomical operations, an accident happened which had like to have disconcerted the whole scheme. This was the loss of their quadrant, which had been stolen by some of the natives; but, chiefly through the exertions of Mr Banks, it was recovered, and the observations made accordingly. Scarce was this accomplished, however, before another theft of the natives demanded the most serious consideration of the commander. Some of them taking advantage of the attention of the officers being otherwise engaged, took the opportunity of breaking into one of the store-rooms, and stealing from thence a bag of spike nails of no less than an hundred weight. This was a most important affair; for as those nails were of great estimation among the Indians, the possession of such quantity must undoubtedly have much lessened their value, and thus rendered provisions of every kind greatly dearer on the island than before. One of the thieves therefore being discovered, was punished with 200 lashes; notwithstanding which he obstinately refused to discover any of his accomplices. Repeated thefts committed afterwards required all the wisdom and resolution of Mr Cook to conduct himself in a proper manner. After due consideration, he judged it to be a matter of importance to put an end to these practices at once, by doing something which might engage the natives themselves to prevent them for their common interest. This, however, he was not at present able to accomplish; nor indeed did it seem possible to prevent them without using fire-arms, which from motives of humanity he still determined to avoid. At last, after a stay of three months, when preparing to take his leave, the most disagreeable adventure took place that he had hitherto met with. This was the desertion of two of his people, who having married young women of the country, determined to take up their residence in it. Mr Cook was now obliged to seize some of the chiefs, and to inform them that they could not obtain their liberty unless the deserters were recovered. This at last produced the desired effect; the deserters were given up, and Mr Cook set sail, along with Tupia (who had formerly been the prime minister to Obeera, a princess of the island) and a boy of 13 years of age, both of whom were desirous of accompanying him to England.

While Mr Cook proceeded to visit others of the South Sea Islands, Tupia occasionally served as an in-

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terpreter. On his arrival in New Zealand, Mr Cook found the people extremely hostile and insolent. At their very first meeting, one of the natives having threatened to dart his lance into the boat, was shot dead. Another, having carried off Mr Green's hanger, was fired at with small shot; and upon his still refusing to restore it, was fired at with ball and killed. This, however, produced very little effect on the rest, who offered to make an attack upon them, till several muskets were fired with small shot, which wounded three or four more. Next day the commander, having determined to force some of the natives on board, in order to conciliate their affections by kind treatment, directed his men to follow two canoes whom he perceived under way before him. One made her escape, but the other, not observing the boats in pursuit, was overtaken; on which the savages plied their oars so briskly, that the ship's boats were not able to keep up with them. Tupia, whose language the New Zealanders understood, called to them to return, with assurances that no hurt should be done them; but they continued their flight without minding him. A musket was then fired over their heads with a view to intimidate them, but upon this they prepared to fight; and on the coming up of the boats began the attack with so much vigour, that the lieutenant's people were obliged to fire upon them with ball, by which four out of seven that were in the boat were killed, and the other three jumped into the water, and were taken on board.

This part of Mr Cook's conduct seems inconsistent with that humanity for which he was in general so eminently distinguished; he was aware of the censure, and makes the following apology. "These people certainly did not deserve death for not choosing to confide in my promises, or not consenting to come on board my boat, even if they had apprehended no danger: but the nature of my service required me to obtain a knowledge of their country, which I could no otherwise obtain but by forcing into it in an hostile manner, or gaining admission through the confidence and good-will of the people. I had already tried the power of presents without effect; and I was now prompted by my desire to avoid farther hostilities, to attempt to get some of them on board; the only method we had left of convincing them that we intended them no harm, and had it in our power to contribute to their gratification and convenience. Thus far my intentions certainly were not criminal; and tho' in the contest, which I had not the least reason to expect, our victory might have been complete without so great an expence of life; yet in such situations, when the command to fire has once been given, no man can pretend to restrain its excess, or prescribe its effect."

Notwithstanding the disaster just mentioned, to which the three New Zealanders, who were taken on board, had been witnesses, they were soon conciliated, and began to sing with a degree of taste that surprised the English gentlemen. They were boys, the oldest about 19 and the youngest about 11; but no kindness which could be shown them was in any degree effectual to bring about a reconciliation with the rest. On the contrary, having perceived the ship in some distress, they instantly showed a disposition to make an attack; and from this they were only prevented by

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the firing of a four-pounder charged with grape-shot. Even this did not produce any permanent effect; another attack was determined upon, and would undoubtedly have been made, had not Tupia informed them, that if they persisted in the attempt, the arms of their adversaries, like thunder, would destroy every one of them. This was enforced by the fire of another four-pounder with grape-shot, which spreading wide in the water, terrified them to such a degree that they began to paddle away as fast as possible. Notwithstanding this, however, some intercourse began to take place; but in every instance the New Zealanders manifested their hostility and treachery in such a manner as showed that they were not to be gained by fair means. At last an attempt to carry off Tayeto, Tupia's boy, rendered it absolutely necessary to fire upon them in order to rescue him from certain destruction, some of the savages having got him into a canoe, where they held him down by violence. In consequence of this one of the savages was killed on the spot, and several more wounded, by the discharge of muskets from the boats; Tayeto recovered his liberty, jumped into the water, and swam to the ship. Some partial intercourse again took place: but still it appeared that the innate rancour of these savages was neither to be subdued by fair means nor foul; and it was only by the powerful arguments of cannon and musketry that they could be kept from attempting to do mischief.

From the account of this voyage published by Dr Hawkesworth, indeed, it appears, that a considerable number of savages perished in a manner similar to that above mentioned, and they seem to have manifested a more hostile behaviour than afterwards; on those melancholy occasions, however, it is observed to the honour of Mr Cook, that his humanity was eminently conspicuous beyond that of the common people, who all along showed as much inclination to destroy the Indians as a sportsman does to kill the game he pursues.

While Mr Cook coasted the islands of New Zealand, he was sometimes in the most imminent danger of being shipwrecked. In the latitude of 35° south, and in the midst of summer in that climate, he met with such a gale of wind as he scarce ever experienced before; so that he was no less than three weeks in getting ten leagues to the westward, and two more before he could get 30 leagues farther. Fortunately, however, they were all this time a considerable way from land, otherwise it is probable that the storm must have proved fatal.

Mr Cook having spent six months in circumnavigating and fully exploring the islands of New Zealand, he sailed from thence on the 31st of March 1770. It must be observed, however, that the extreme hostility manifested by the inhabitants in that part of the island where he first arrived, was not universally diffused, but that a friendly intercourse was for a long time maintained with those about Queen Charlotte's Sound. From New Zealand he proceeded to New Holland, and on the 28th of April came in sight of Botany Bay. Here all their endeavours to induce the natives to have any intercourse with them proved ineffectual, though happily there was no blood spilt in any quarrel.

During their navigation round New Holland, the

coasts of which are full of dangerous rocks and shoals, our navigators were brought into a more perilous situation than ever; and from which the escape was so extraordinary, that it deserves a particular relation. This happened on the 10th of June 1770, as they pursued their course from Trinity Bay, and nearly in the latitude assigned to the islands discovered by Quiros. At that time they had the advantage of a fine breeze and a clear moonlight; and in standing off from six till near nine o'clock, the ship had deepened her water from 14 to 21 fathoms; but while the navigators were at supper, it suddenly shoaled to 12, 10, and 8 fathoms in the space of a few minutes. Every thing was then ready for putting the ship about, when they suddenly got into deep water again, and continued in 20 and 21 fathoms for some time, so that the gentlemen went to bed in perfect security. A little before eleven, however, the water shoaled at once from 20 to 17 fathoms; and before the lead could be heaved again, the ship struck, and remained immovable, excepting as far as she was heaved up and down, and dashed against the rocks by the surge. The alarm was now universal, and not indeed without the greatest reason. It appeared that the vessel had been lifted over the ledge of a rock, and lay in a hollow within it, where there were in some places from three to four fathoms water, and in others scarce as many feet: the sheathing boards were disjoined, and floating round the ship in great numbers; and at last the false keel also was destroyed, while the rock kept grating her bottom with such force as to be heard in the fore store-room. It was now necessary to lighten the ship as much as possible; and this was done with all expedition to the amount of more than 50 tons. In the morning of the 11th of June they discovered the land at about eight leagues distance, without any island between, on which they could have been sent ashore in the event of the ship going to pieces, that so they might have been carried to the main land by turns. To add to their distresses, the ship drew so much water, that it could scarce be kept under by three pumps. Lastly, it appeared, that even the rising of the tide, on which they had ultimately depended for relief, was insufficient to answer the purpose, as the day-tide fell considerably short of that in the night-time. Having therefore lightened the ship still farther, by throwing out every thing that could possibly be spared, they waited with patience for the next tide; when, after incredible exertion, the ship righted, and they got her over the ledge of the rock into deep water. By continual labour, however, the men were at last so much exhausted, that they could not stand to the pumps more than five or six minutes at a time; after which they threw themselves flat on the deck, though a stream of water between three and four inches deep ran over it; and in this situation they lay till others, exhausted as well as themselves, took their places, on which they started up again, and renewed their exertions. In this dreadful extremity, Mr Monkhouse, a midshipman, proposed the expedient of fothering the ship, as it is called, by which means he said that he had seen a merchant ship brought from Virginia to London after she had sprung a leak that admitted more than four feet water in an hour. The expedient being approved of, it was put in execution in the following manner. He

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took a lower fludding-sail, and having mixed a large quantity of oakum and wool together, stitched them down by handfals as lightly as possible; the whole being afterwards spread over with the dung of the sheep and other filth. The sail was then hauled under the ship's bottom by means of ropes which kept it extended. When it came under the leak, the wool and oakum, with part of the sail, were forced inwards by the pressure of the water, which thus prevented its own ingress in such an effectual manner, that one pump, instead of three, was now sufficient to keep it under. Thus they got the ship into a convenient port on the coast of New Holland, where there was an opportunity of fully repairing her defects. Here they discovered that their preservation had not been owing entirely to the expedient above mentioned; for one of the holes was in a great measure filled up by a piece of rock which had broken off and stuck in it; and this hole was so large, that had it not been filled up in the manner just mentioned, they must undoubtedly have perished notwithstanding all the assistance that could have been derived from the pumps.

The dangers they sustained in navigating this coast were innumerable, insomuch that for very near three months they were obliged to have a man constantly in the chains heaving the lead. They were always entangled among rocks and shoals, which could not have failed to destroy a less experienced navigator; and even Mr Cook, with all his sagacity, could not sometimes have extricated himself, had it not been for the favourable interposition of some natural events, which no human penetration could foresee or have the least dependence upon. Of this we shall only give the following instance. Having at last, as they thought, got safely over the vast recess of sunk rocks with which the coast of New Holland is surrounded, they flattered themselves that all danger was passed, and the vast swell of the water convinced them that they were now in the open ocean. The remembrance of former dangers, however, induced them frequently to take the precaution of sounding; notwithstanding which, in the latitude of about $14\frac{1}{2}^{\circ}$ S. they found themselves one morning only about a mile distant from the most hideous breakers, though the sea all around was unfathomable. Their situation was rendered the more dreadful by its being a dead calm, at the same time that they were carried towards the rock with such rapidity, that by the time they had got the ship's head turned by means of the boats, she was scarcely 100 yards distant from it. Their only resource then was to tow the ship, if possible, by means of the boats and pinnace, out of a situation so very perilous; but all their efforts would have been unsuccessful, had not a breeze of wind sprung up, which, though too light to have been noticed at any other time, was found to second their efforts so effectually, that the ship began to move perceptibly from the reef in an oblique direction: during the time that this breeze lasted, which was not more than ten minutes, they had made a considerable way. A dead calm succeeding, they began to lose ground, and in a little time were driven within 200 yards of the rocks: but fortunately the breeze returned, and lasted ten minutes more; during which time a small opening was perceived in the reef at the distance of about a quarter of a

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mile. The mate being sent out to examine this opening, reported that it was not more than the length of the ship in breadth, but that there was smooth water within. On this it was determined to push into it by all means. The attempt failed of success; as, just when they had brought the ship with great labour to the mouth of the opening, they found a current setting out from it by reason of the tide now beginning to ebb. But though their hopes were disappointed in getting through the opening, they were, by the current setting out from it, driven in a very short time to the distance of a quarter of a mile from the rocks; and by dint of towing and other exertions, they were got by noon to the distance of two miles. This temporary deliverance, however, afforded but small prospect of being ultimately relieved. They had still no other expectation than of being forced back into their former situation by the return of the tide; but happily they now perceived another opening about a mile to the westward. Mr Hicks the lieutenant being sent to examine this opening, returned with an account of its being narrow and hazardous, but capable of being passed. To this place therefore the ship was directed by every possible means; and a light breeze happening to spring up, they fortunately reached it, and were instantly hurried through with great rapidity by the current of the returning tide; which, had it not been for this opening, would undoubtedly have dashed them to pieces against the rocks.

From the time they quitted the coast of New Holland till their arrival at Batavia in the island of Java, our navigators met with no other danger but what is common in sea-voyages. They were obliged to stay for some time at this place to repair their damages; and on viewing the condition of the ship, found they had more reason than ever to admire the manner in which they had been preserved. Both the false-keel and main-keel were greatly injured; great part of the sheathing was torn off; several of the planks were much damaged, and among these there were two, and half of another, which for six feet in length were not above the eighth part of an inch in thickness, besides being penetrated with worms quite to the timbers. Here the crew were excessively annoyed by sickness, which obliged them to remain much longer than they would otherwise have done: and it is worthy of notice, that every one of the crew was ill excepting the sail-maker, an old man between 70 and 80 years of age, and who was drunk every night. Poor Tupia, with his boy Tayeto, fell sacrifices to the unhealthiness of the climate, as well as the surgeon, three seamen, and Mr Green's servant. Nor did the evil stop here; for on their setting out from Batavia, the seeds of disease which had been received there broke out in the most violent and fatal manner, insomuch that in the course of about six weeks there died one of Mr Banks's assistants, by name Mr Sporing, Mr Parkinson his natural history painter, Mr Green the astronomer, the boatswain, carpenter, and mate; Mr Monkhouse the midshipman, the corporal of the marines, two of the carpenter's crew, and nine seamen. Even the jolly old sail-maker could now hold out no longer; but whether his death might not in some measure be attributed to his being less plentifully supplied with liquors than formerly,

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formerly, might have deserved inquiry. These unfortunate events probably made a considerable impression on Mr Cook's mind; and perhaps induced him to direct his attention to those methods of preserving the health of seamen which he afterwards put in execution with so much success. After touching at St Helena, they continued their voyage for England, where they arrived on the 11th of June 1771; and on the 29th of August the same year, his Majesty testified his approbation of Mr Cook's conduct by appointing him a captain in the navy. On this occasion Mr Cook wished to have been advanced to the rank of post-captain, which, though not more profitable than the other, is more honourable; but this being inconsistent with the rules of preferment in the navy, the earl of Sandwich, at that time at the head of the admiralty, could not agree to it.

Captain Cook was not allowed to remain long inactive. The idea of a southern continent had long been entertained, and Mr Dalrymple had renewed the attention of the public towards the question, by his historical collection of voyages to the Pacific Ocean, published in two quarto volumes, one in 1770, the other in 1771. To determine the matter finally, Captain Cook was again sent out: and the object of this voyage was not merely to settle the question just mentioned, but to extend the geography of the globe to its utmost limits. That the undertaking might be carried on with the greater advantage, it was determined to employ two ships, on the choice and equipment of which the utmost attention was bestowed. The successful voyage which had already been made in the *Endeavour*, suggested the idea of that ship being a proper model for the two which were to be sent out; and the opinion of Lord Sandwich concurring with the general idea, two vessels, constructed by the same person who had built the *Endeavour*, were purchased for the voyage. These were about 14 or 16 months old at the time they were purchased; and in the opinion of Captain Cook, were as fit for the purpose as if they had been but newly built. The larger of the two, of 462 tons burden, was named the *Resolution*; the smaller, of 336 tons, had the name of the *Adventure*: the complement of men on board the former, of which Captain Cook was commander, being 112; on the latter, commanded by Mr Tobias Furneaux, 81. In their equipment, every article that could be supposed necessary, however much out of the common line, was procured, and every circumstance that could be supposed to contribute to the success of the voyage was attended to in the most scrupulous manner. Besides the usual stores and provisions, all of which were of the best kinds, the ships were furnished with malt, four-knot, salted cabbage, portable soup, salop, mustard, marmalade of carrots, beer, and inspissated wort. Mr Hodges, an excellent landscape painter, was engaged to make drawings and paintings of such objects as required them. Mr John Reinhold Forster, with his son, were both engaged, in order to explore and collect the natural history of the countries through which they passed; and lastly, that nothing might be wanting to render the voyage as complete as possible, Mr William Wales and Mr William Bayley were engaged by the board of longitude to make celestial observations. They were furnished with the

best instruments of every kind, and among the rest with four time-pieces; three constructed by Mr Arnold, and one by Mr Kendal on Mr Harrison's principles.

At Plymouth Captain Cook received his instructions; which were not only to sail round the globe, but to sail round it in high southern latitudes, and to make such traverses as might finally resolve the question concerning the southern continent. In pursuance of these instructions he set sail on the 13th of July 1772, and on the 29th of the same month reached the *Madeira*. As he proceeded afterwards in his voyage, he made three puncheons of beer from the inspissated wort carried out along with him, and found it excellently to answer the purpose, provided the material could have been kept without fermentation in its inspissated state; but as this was found impossible, the expedient seems to have failed. In this voyage, however, the Captain used with the greatest success such methods as appeared likely to contribute to the preservation of the health of his men. In rainy weather, he took care that the ship should be aired and dried by means of fires made between the decks, the damp places were smoked, and the people were ordered to air their bedding, and wash and dry their clothes, whenever an opportunity offered. Thus he reached the Cape of Good Hope without having a single man sick. Having left it, and kept on his course to the southward, he soon began to meet with cold and stormy weather, by which he lost almost the whole of his live stock of sheep, hogs, and geese. The bad effects of this stormy weather upon the men were guarded against by an addition to their clothing, and giving them a dram on particular occasions. On the sixth of December, being in the latitude of $50^{\circ} 40'$, he fell in with islands of ice, and continued among them in various latitudes till the 17th of January 1773; when he set sail for New Zealand, which he reached on the 27th.

The reception of our navigator by the New Zealanders was now much more friendly than in the former voyage, so that there were no contests with the natives; nor did Captain Cook observe any one of those whom he had seen before, neither was there the smallest remembrance of former hostilities. Having staid in this country till the 7th of June, our navigators set sail for Otaheite; but during the voyage the crews of both ships were attacked by the scurvy. Those of the *Adventure* were in a very sickly state; the cook was dead, and 20 of her best men incapable of duty. On board the *Resolution* matters were much better; and the only reason that could be conjectured for the difference was, that the people of the *Adventure* had been in an habit of body more inclined to the scurvy than those of the *Resolution*, and had eat fewer vegetables. Here it was observed, that the aversion of seamen to a change of diet is so great, that it can only be overcome by the steady and persevering example of a commander. While he remained at New Zealand, the Captain had discovered a tree which greatly resembled the American black-spruce. Persuaded, therefore, that it would be attended with effects equally salutary on the health of the people, he employed them in brewing beer from it. This was done while they continued at Dusky Bay, in order to supply the want of vegetables, which were not to be
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procured there; but on removing to Queen Charlotte's Sound, they were more fortunate. Captain Cook himself went to look out for antiscorbutic vegetables; and returned in a very short time with a boat-load of scurvy-grass, celery, &c. These were boiled with the peas and wheat; and though some of the people disliked them at first, they soon became so sensible of their good effects, that they cheerfully followed the example of the rest; and the freedom of the crew from the scurvy and other distempers was by every one attributed to the New Zealand spruce beer and vegetables. From this time forward the Captain had scarce occasion to give orders for gathering vegetables when they came to any land.

During this voyage Captain Cook experienced another narrow escape from shipwreck. Being becalmed at the distance of half a league from a reef of rocks near Osnaburg Island, it was found necessary to order out the boats to tow off the ships; but this was found impossible. The calm continuing, and the situation of our navigators becoming every moment more dangerous, the Captain attempted to get through an opening in the reef which he had judged practicable; but on approaching it, found that there was not sufficient depth of water; at the same time that the draught of the tide through it forced the ship thither in a manner scarce to be resisted. One of the warping machines, with about 400 fathoms of rope, was then ordered out, but did not produce any effect. They were within two cables length of the breakers, and no bottom could be found for casting anchor. Having no other resource, however, they did drop an anchor; but before it took hold, the Resolution was in less than three fathoms water, and struck at every fall of the sea, which broke violently close under her stern, threatening destruction to every one on board. At last the tide ceasing to act in the same direction, the boats were ordered to try to tow off the vessel; in which being assisted by the land-breeze, which fortunately sprung up at that instant, they with much labour succeeded.

Having spent a considerable time in the South Sea islands, Captain Cook returned to New Zealand, and from thence set sail for the southern part of the continent of America. Here he explored all the islands in the neighbourhood, and then returned to England, where he arrived in safety on the 30th of July 1774, having been absent three years and 18 days; and in all that time lost only one man, who died of a consumption probably begun before he set out on the voyage.

The reception our navigator now met with was suited to his merit. He was immediately raised to the rank of post-captain, and soon after unanimously elected a member of the Royal Society; from whom he received the prize of the gold medal for the best experimental paper that had appeared throughout the year. It was the custom of Sir John Pringle, at the delivery of this medal, annually to make an elaborate discourse, containing the history of that part of science for which the medal was given; and as the subject of Captain Cook's paper (the means of preserving the health of seamen) was analogous to the profession of Sir John Pringle himself as a physician, he had the greater opportunity of displaying his eloquence on the occasion.

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The speech he made was in the highest degree honourable to Captain Cook. He remarked, that the Society had never more meritoriously bestowed the medal than on the person who now received it. "If (says he) Rome decreed the civic crown to him who saved the life of a single citizen, what wreaths are due to the man who, having himself saved many, perpetuates in your Transactions the means by which Britain may now, on the most distant voyages, preserve numbers of her intrepid sons, her mariners; who braving every danger, have so liberally contributed to the fame, to the opulence, and to the maritime empire of the country?" These honourable testimonies of the public regard, however, Captain Cook did not receive, being already embarked on another voyage, from which he never returned.

The third voyage of this celebrated navigator was not undertaken by any express command of his Majesty. Captain Cook had already done so much, that it was thought but reasonable he should now spend the remainder of his life in quiet; and in order to enable him to do this in a more comfortable manner, besides his rank of post-captain in the navy, he was also made a captain in Greenwich. Still, however, there were some points in the science of geography which had very much engaged the attention of the public, and were indeed of such importance as to become a national concern. These were to discover the connection between Asia and America, and to determine whether there was not a possibility of shortening the passage to the East Indies by sailing round the northern parts of the continents of Europe and Asia. Many attempts, indeed, had already been made by various navigators of different nations; but all of them had failed, and, what was worse, had left the point still undetermined. An act of parliament had been passed in 1745, by which a reward of L. 20,000 was held out to the ships of any of his Majesty's subjects for accomplishing this important voyage, but without mentioning any thing of those belonging to his Majesty; and this reward was further confined to the finding out of the north-west passage to the East Indies through Hudson's Bay. In the year 1776, however, both the errors just mentioned were corrected. It was now enacted, "That if any ship belonging to any of his Majesty's subjects, or to his Majesty, shall find out, and sail through, any passage by sea between the Atlantic and Pacific Oceans, in any direction or parallel of the northern hemisphere, to the northward of the 52d degree of northern latitude; the owners of such ships, if belonging to any of his Majesty's subjects, or the commanders, officers, and seamen, of such ship belonging to his Majesty, shall receive, as a reward for such discovery, the sum of L. 20,000.

It was not, as has already been hinted, now deemed proper to solicit Captain Cook to undergo fresh dangers by undertaking a voyage of this kind; nevertheless, as he was universally looked upon to be the fittest person in the kingdom for the purpose, the eyes of every one were tacitly fixed upon him: he was consulted on every thing relating to it, and solicited to name the person whom he judged most proper to conduct it. To determine this point, Captain Cook, Sir Hugh Palliser, and Mr Stephens, were invited to the house of Lord Sandwich to dinner; where, besides

Cook. the consideration of the proper officer for conducting the expedition, many things were said concerning the nature of the design. They enlarged upon its grandeur and dignity, its consequences to navigation and science, and the completeness it would give to the whole system of discoveries; until at last Captain Cook was so much inflamed by the representation of the importance of the voyage, that he started up, and declared that he would conduct it himself. This was what the parties present had desired, and probably expected; his offer was therefore instantly laid before the king, and Captain Cook appointed commander of the expedition by the 10th of February 1776. At the same time it was agreed, that on his return from the voyage he should be restored to his place at Greenwich; and if no vacancy occurred during the interval, the officer who succeeded him was to resign in his favour. The instructions he now received were, that he should attempt the high latitudes between the continents of Asia and America, and if possible return to England along the northern coasts of Asia and Europe. This was most probably the result of the Captain's own deliberations, and what had been suggested by him to Lord Sandwich and other people in power. He was particularly desired to sail first into the Pacific Ocean thro' the chain of newly discovered islands which he had lately visited. After having crossed the equator, and passed into the northern parts of the ocean just mentioned, he was then to hold such a course as might tend to settle many interesting points of geography, and produce some intermediate discoveries, before he arrived at the main scene of operation. With regard to this principal object, he was ordered, immediately on his arrival on the coast of New Albion, to proceed northward as far as the latitude of 65 degrees, without losing any time in exploring creeks or rivers previous to his arrival in that latitude: and for his further encouragement, the act of 1745, offering a premium for the discovery of the passage, was amended in the manner above mentioned. That nothing might be wanting which could promote the success of the grand expedition, Lieutenant Pickersgill was sent out, in 1776, with directions to explore the coasts of Bassin's Bay; and the next year Lieutenant Young was commissioned not only to examine the western parts of that bay, but to endeavour to find a passage on that side from the Atlantic to the Pacific Ocean. Nothing, however, was performed by either of these gentlemen which in the least could promote Captain Cook's success. Two vessels were provided as in the former voyage, viz. the *Resolution* and the *Discovery*; the command of the former being given to Captain Cook, and of the latter to Captain Charles Clerke. The only thing in which the appointment of the *Discovery* differed from that of the *Resolution* was, that the former had no marine officer on board. Every degree of attention was bestowed, as in the former voyage, upon the proper victualling and other necessities for the two ships; and that the inhabitants of those countries which our navigator intended to visit might derive some permanent benefit from the intercourse they had with him, it was determined to send abroad a breed of domestic animals, and likewise a quantity of useful seeds, to be left in proper places. With this view, a bull, two cows with their calves, and several sheep, with hay and

corn for their subsistence, were taken on board; and it was likewise purposed to take in others at the Cape of Good Hope. A large assortment of iron tools and trinkets was also sent out; and, in short, every thing that could be judged proper either to conciliate the good will of the natives or to prove serviceable to them, was provided for the voyage, as well as every convenience for the ships companies. In the former voyage Captain Cook had brought along with him a native of one of the South Sea islands, named *Omai*, who resided in England during the interval between the second and third voyages, and was now happy at getting an opportunity of returning to his own country. Though he could by no means complain of the entertainment he had met with in England, the idea of returning home loaded with treasure, which might enable him to make a figure among his countrymen, soon overcame all uneasy sensations which the leaving of his English friends might excite. His majesty had taken care to furnish him with every thing that could possibly be of use when he came to his native country; and he had besides received several valuable presents from Lord Sandwich, Sir Joseph Banks, and several ladies and gentlemen of his acquaintance; so that nothing was omitted which could possibly be done to convey, by his means, to the inhabitants of the South Sea Islands an idea of the British power and greatness.

Every thing being prepared for the voyage, our navigator set sail from the Nore on the 25th of June 1776: but by reason of some delay in receiving his instructions, did not leave Plymouth till the 12th of July. He had not been long at sea before he began his operations for preserving the health of his people; which were found equally efficacious in this as in the former voyage. Finding his stock of provender for the animals on board likely to run short, he touched at Teneriffe, in order to procure a supply, having judged that to be a more proper place than Madeira for the purpose. On sailing from thence he ran a great risk of running upon some sunk rocks on the island of Bonavista; but in this, as well as on other occasions of danger, he behaved with the same judgment, coolness, and presence of mind, that distinguished him throughout the whole course of his life. On the 12th of August he arrived before Port Praya, in one of the Cape de Verde islands named *St Jago*; but not finding it necessary to go in there, he continued his voyage to the southward. The weather now becoming gloomy and rainy, required a continuance of the methods he had already practised for preserving the health of his people; and, as formerly, they were attended with the greatest success. In this voyage, the effect of these precautions was the more remarkable, as at this time the seams of the vessel were opened to such a degree as to admit the rain, so that scarce any person on board could lie dry in his bed; and all the officers in the gun-room were driven out of their cabbins by the water which came through the sides. Such was the humanity of the commander, however, that while the ships continued at sea, he would not trust the workmen over their sides to repair the defects, though caulkers were employed in the inside as soon as settled weather returned. On the 1st of September our navigators crossed the equator, and on the

Cook. the 18th of October anchored in Table Bay at the Cape of Good Hope. Here they met with a violent tempest, the effects of which were felt both on sea and land. It lasted three days, and the Resolution was the only ship in the bay that rode out the storm without dragging her anchors. On shore the tents and observatory were destroyed, and the astronomical quadrant narrowly escaped irreparable damage. The Discovery, which had been some time later in sailing from England, was driven off the coast, and did not arrive till the 10th of November.

While they remained in this place, a disaster happened which threatened the loss of most of their live stock. The bull and two cows had been put ashore to graze among other cattle; but Captain Cook had been advised to keep the sheep, 16 in number, near the tents, where they were penned in every night. Some dogs having got in among them in the night-time, killed four, and dispersed the rest. Six of them were recovered the next day, but the two rams and two of the finest ewes in the flock were missing. The captain applied to Baron Plettenburg the governor; but all his endeavours were unsuccessful, until he employed some of the meanest and lowest of the people, fellows whose character was, that for a ducatoon they would cut their master's throat, burn the house over his head, and bury him and his whole family in ashes. This is mentioned as an instance how far the boasted policy of the Dutch government at the Cape of Good Hope falls short of its alleged perfection. After all, two of the finest ewes in the flock were missing, and never could be recovered. The captain, therefore, to repair this loss, and to make an addition to his original stock, purchased two young bulls, two stone horses, two mares, two heifers, two rams, several ewes and goats, with some rabbits and poultry; when, having finished all his business, he set sail on the 30th of November, though it was not till the 3d of December that he got clear of land. Soon after his putting to sea, he had the misfortune to lose several of the goats, especially the males, together with some sheep; and it was with the utmost difficulty that the rest of the cattle were preserved, by reason of the ship tossing and tumbling about in a very heavy sea. Having explored some desolate islands in the southern seas, Captain Cook set sail for New Zealand. During this part of the voyage, our navigators were involved in so thick a fog, that, according to the authors of Captain Cook's life, "they sailed 300 leagues in the dark." The first land they afterwards reached was New Holland; where, having remained till the 30th of January 1777, they set sail for New Zealand, and on the 12th of February they anchored in Queen Charlotte's Sound. Here the people were shy and timorous, on account of their having formerly destroyed 10 of Captain Furneaux's people, who had been sent ashore to gather vegetables. The cause of the quarrel could not be known, as none of the party were left alive to tell the news. Lieutenant Burney, who went ashore in quest of them, found only some fragments of their bodies; from which it appeared that they had been killed and eaten by the savages. It was not the intention of Captain Cook, at this distance of time, to resent the injury; he even refused to put to death a chief named *Kahoora*, who, as he was informed by the natives themselves, had killed Mr Rowe the commander of the par-

ty. He was, however, particularly careful that no opportunity should now be given the savages of committing such an action with impunity; and with this view a boat was never sent on shore without being well armed, and the men under the command of such officers as could be depended upon. The New Zealanders were no sooner assured of Captain Cook's pacific disposition, than they threw aside their fears and suspicions, and entered into a commercial intercourse with the people. It would have been the less excusable in Captain Cook to have revenged at this time the massacre of Mr Rowe's party, as he was assured that the quarrel originated from some petty thefts of the savages, which were too hastily resented on the part of the British; and had it not been for this, no mischief would have happened.

On the 25th of February our navigator left New Zealand, taking with him, at the request of Omai, two boys, the eldest about 18 and the youngest about 10. These were soon cured of their passion for travelling, being both violently sea-sick: but as it was then too late to repent, they expressed their grief in loud and almost continual lamentation; and this in a kind of song which seemed to consist of the praises of their native country, whence they were now to be separated for ever. By degrees, however, the sea-sickness abated, their lamentations became less frequent, and at last ceased entirely; their native country was forgotten, and they appeared to be as firmly attached to their new friends the English as if they had been born among them.

So much time was now spent in sailing up and down in the Pacific Ocean, where several new islands were discovered, that Captain Cook judged it impossible to accomplish any thing for this year in the high northern latitudes; for which reason he determined to bear away for the Friendly Islands, in order to supply himself with those necessaries which he had found impossible to be got at any of the islands which he had just discovered. In his run thither several new islands were visited; and in prosecuting these discoveries our navigator once more narrowly escaped being shipwrecked. The danger at this time arose from a low sandy island, which the Resolution was very near running upon. From this she was only saved by the circumstance of all the men having been accidentally called upon deck to put the vessel about, and most of them being at their stations when the danger was discovered. Soon after this both ships struck upon some sunk coral rocks, but happily were got off without damage.

After a stay of between two and three months, Captain Cook took leave of the Friendly Islands on the 13th of July 1777; and on the 12th of August reached Otaheite, where he introduced Omai to his country people, and whose reception by them is particularly related under the next article. Here the captain found the people of Otaheite ready to engage in a war with those of Eimeo; but though strongly solicited by the former to assist them in an expedition against their enemies, he refused to take any concern in the affair, alleging, by way of excuse, that the people of Eimeo had never offered him. This seemed to satisfy most of the chiefs; but one, named *Towha*, was so much displeased, that Captain Cook could never regain his favour. He even threatened, that as soon

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Cook. soon as the captain should be gone, he would make war upon Otoo, one of the princes of these islands whom he knew to be in strict friendship with him; but from this he was deterred by the captain's threatening to return and chastise him if he made any such attempt. As a mark of Otoo's friendship, he gave our navigator a canoe, which he desired him to carry to the king of Britain, having nothing else, as he said, worth his acceptance.

From Otaheite Captain Cook proceeded to Eimeo, where, on account of some thefts committed by the natives, he was obliged to commence hostilities, by burning a number of their war canoes, and even some houses. These transactions gave him much concern; and the more that he had been so much solicited to make war on these people by his friends at Otaheite, to whose intreaties he had refused to listen. From Eimeo he proceeded to Huaheine, where he saw Omai finally settled, and left with him the two New Zealand youths already mentioned. The youngest of these was so much attached to the English, that it was necessary to carry him out of the ship and put him ashore by force. During his stay on this island, the captain was obliged to punish a thief with greater severity than he had ever done before, viz. by causing his head and beard to be shaved, and his ears cut off. Some other disagreeable transactions took place, particularly the desertion of two of his people, who were not recovered without the greatest difficulty. In the course of his exertions for their recovery, he found it necessary to detain the son, daughter, and son-in-law, of the chief of an island named Otaha. This had almost produced very serious consequences, the natives having formed a plot for carrying off Captain Cook himself, as well as Captain Clerke and Mr Gore. With regard to the commander, they were disappointed by his own caution and vigilance; but Messrs Clerke and Gore were in particular danger: and it was only owing to the circumstance of one of them having a pistol in his hand, as they walked together on shore, that they were not seized.

Having left the Society Islands, and discovered a new group, which, in honour of his patron the Earl of Sandwich, our commander named the *Sandwich Isles*, he set out on the 2d of January 1778 on his voyage northward. In this he was very successful, ascertaining the vicinity of the continents of Asia and America, which had never been done, or but very imperfectly, before. From these desolate regions he returned to the island of Oonalashka; whence having refitted and taken in provisions, he returned to the southward, and on the 26th of November reached the Sandwich Islands, where he discovered a new one named *Mowee*, and on the 30th of the same month another of much larger extent, named *Owhy-hee*. Seven weeks were spent in exploring the coasts of this island; and during all this time he continued to have the most friendly intercourse with the people, who, however, appeared to be much more numerous and powerful than those of any island our navigators had yet touched at. Several of the chiefs and principal people had attached themselves greatly to the commander, and in general the people appeared to be much more honest in their dispositions than any whom he had ever visited. But by the time he had finished

his circumnavigation of the island, and cast anchor in a bay called *Karakakooa*, matters were greatly altered. An universal disposition to theft and plunder had now taken place; and in this it was evident that the common people were encouraged by their chiefs, who shared the booty with them. Still, however, no hostilities were commenced: the greatest honours were paid to the commander; and, on his going ashore, he was received with ceremonies little short of adoration. A vast quantity of hogs and other provisions were procured for the ships; and on the 4th of February 1779, they left the island, not without most magnificent presents from the chiefs, and such as they had never before received in any part of the world. Unluckily they met with a storm on the sixth and seventh of the same month; during which the *Resolution* sprung the head of her foremast in such a manner that they were obliged to return to *Karakakooa* bay to have it repaired. As they returned, Captain Cook had an opportunity of showing his humanity to the people by the relief he afforded to some of their canoes which had suffered in the storm. The same friendly intercourse which had formerly been held with the natives now commenced, and Captain Cook was treated with the usual honours; but on the 13th of this month it was unhappily broken off on the following account. One of the natives being detected in stealing the tongs from the armourer's forge in the *Discovery*, was dismissed with a pretty severe flogging; but this example was so far from being attended with any good effect, that in the afternoon another, having snatched up the tongs and a chisel, jumped overboard with them and swam for the shore. The master and midshipman were instantly dispatched in pursuit of him; but he escaped on board a canoe, which paddled away so quickly that the cutter could not come near it. A chief named *Pareah*, who was at this time on board the *Resolution*, understanding what had happened, promised to go ashore and get back the stolen goods; but before this could be done the thief had made his escape into the country. Captain Cook, who was at that time ashore, had endeavoured to intercept the canoe when it landed, but was led out of the way by some of the natives who pretended to be his guides. The tongs and chisel, however, were brought back to the master as he advanced to the landing place; but he being now joined by some of the rest of the people in the pinnace, could not be satisfied with the recovery of the stolen goods, but insisted upon having the thief or the canoe which carried him by way of reprisal. On his preparing to launch this last into the water, he was interrupted by *Pareah*, who insisted that it was his property, and that he should not take it away. As the officer paid no regard to his remonstrances, *Pareah*, who seems to have been a very strong man, seized him, pinioned his arms behind, and held him fast by the hair of the head. On this one of the sailors struck the chief with an oar; on which, quitting the officer, he instantly snatched the oar out of the man's hand, and broke it in two across his knee. The Indians then attacked the sailors with stones, and soon drove them to their boats, to which they were forced to swim, as they lay at some distance from the shore. The officers who could not swim retired to a small rock, where they were closely pursued by the Indians; and

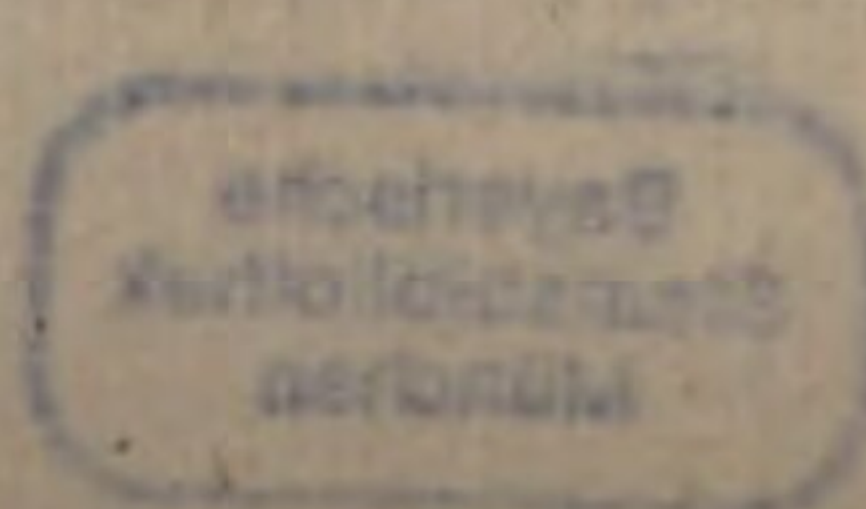
Cook.

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Cook.

and here the master narrowly escaped with his life, till Pareah returned and obliged the Indians to give over their attacks. The gentlemen, sensible that Pareah's presence alone could protect them, entreated him to remain with them till they could be brought off in the boats. On his refusal, the master set out to the place where the observatories had been erected, for farther assistance; but Pareah, who met him, and suspected his errand, obliged him to return. In the mean time the multitude had begun to break in pieces the pinnace, after having taken every thing out of her that was loose: on the return of Pareah, however, they were again dispersed, and some of the oars restored, after which the gentlemen were glad to get off in safety. Before they reached the ship Pareah overtook them in a canoe, and delivered the midshipman's cap which had been taken from him in the scuffle; he also joined noses with them in token of friendship, and desired to know whether Captain Cook would kill him on account of what had happened. They assured him that he would not, and made signs of reconciliation on their part. On this he left them and paddled over to the town of Kavaroah; and that was the last time that he was seen by the English. In the night-time the sentinels were much alarmed by shrill and melancholy sounds from the adjacent villages, which they took to be the lamentations of the women. Next day it was found that the large cutter of the Discovery had been carried off in the night-time; on which Captain Cook ordered the launch and small cutter to go under the command of the second lieutenant, and to lie off the east point of the bay in order to intercept all the canoes that might attempt to get out, and if necessary to fire upon them. The third lieutenant of the Resolution was dispatched to the western part of the bay on the same service; while the master was sent in pursuit of a large double canoe already under sail, and making the best of her way out of the harbour. He soon came up with her, and by firing a few shots, obliged her to run on shore, and the Indians to leave her. This was the canoe belonging to a chief named *Omea*, whose person was reckoned equally sacred with that of the king, and to the neglect of securing him we may attribute the succeeding disaster. Captain Cook now formed the resolution of going in person to seize the king himself in his capital of Kavaroah; and as there was reason to suppose that he had fled, it was his design to secure the large canoes, which on that account he caused to be hauled up on the beach. With this view he left the ship about seven o'clock in the morning of Sunday the 14th of February, being attended by the lieutenant of marines, a serjeant, corporal, and seven private men. The crew of the pinnace, under the command of Mr Roberts, were also armed; and as they rowed towards the shore, the captain ordered the launch to leave her station at the opposite point of the bay, in order to assist his own boat. Having landed with the marines at the upper end of the town, the Indians flocked round him, and prostrated themselves before him. No sign of hostility, nor even much alarmed, appeared; the king's sons waited on the commander as soon as he sent for them, and by their means he was introduced to the king, who readily consented to go on board; but in a little time the Indians began to arm

themselves with long spears, clubs, and daggers, and to put on thick mats which they use as defensive armour. This hostile appearance was greatly augmented by an unlucky piece of news which was just now brought by a canoe, viz. that one of the Indian chiefs had been killed by the people in the Discovery's boats. On this the women, who had hitherto sat on the beach conversing familiarly, and taking their breakfasts, removed, and a confused murmur ran through the crowd. An old priest now appeared with a cocoa-nut in his hand, which he held out as a present to Captain Cook, singing all the while, and making a most troublesome noise as if he meant to divert the attention of the Captain and his people from observing the motions of the Indians, who were now every where putting on their armour. Captain Cook beginning to think his situation dangerous, ordered the lieutenant of the marines to march towards the shore, as he himself did, having all the while hold of the king's hand, who very readily accompanied him, attended by his wife, two sons, and several chiefs. The Indians made a lane for them to pass; and as the distance they had to go was only about 50 or 60 yards, and the boats lay at no more than five or six yards distance from land, there was not the least apprehension of the catastrophe which ensued. The king's youngest son Keowa went on board the pinnace without the least hesitation, and the king was about to follow, when his wife threw her arms about his neck, and, with the assistance of two chiefs, forced him to sit down. The Captain might now have safely got aboard, but did not immediately relinquish the design of taking the king along with him. Finding at last, however, that this could not be accomplished without a great deal of bloodshed, he was on the point of giving orders for the people to reembark, when one of the Indians threw a stone at him. This insult was returned by the Captain, who had a double barrelled piece, by a discharge of small shot from one of the barrels. This had little effect, as the man had a thick mat before him; and as he now brandished his spear, the Captain knocked him down with his musket. The king's son, Keowa, still remaining in the pinnace, and the detaining him would have been a great check upon the Indians; but unluckily Mr Roberts, who commanded the pinnace, set him ashore at his own request soon after the first fire. In the mean time another Indian was observed in the act of brandishing his spear at the commander; who thereupon was obliged to fire upon him in his own defence. Missing his aim, however, he killed one close by his side; upon which the serjeant observing that he had missed the man he aimed at, received orders to fire also, which he did, and killed him on the spot. This repressed the foremost of the Indians, and made them fall back in a body; but they were urged on again by those behind, and discharged a volley of stones among the marines, who immediately returned it by a general discharge of their muskets; and this was instantly followed by a fire from the boats. Captain Cook expressed his astonishment at their firing, waved his hand to them to cease, and called to the people in the boats to come nearer to receive the marines. This order was obeyed by Mr Roberts; but the lieutenant who commanded the launch, instead of coming nearer, put off



Cook.

off to a greater distance; and by this preposterous conduct deprived the unfortunate commander of the only chance he had for his life: for now the Indians, exasperated by the fire of the marines, rushed in upon them and drove them into the water, leaving the Captain alone upon the rock. A fire indeed was kept up by both boats; but the one was too far off, and the other crowded with the marines, so that they could not direct their fire with proper effect. Captain Cook was then observed making for the pinnacle, carrying his musket under his arm, and holding his other hand on the back-part of his head to guard it from the stones. An Indian was seen following him, but with marks of fear, as he stopped once or twice seemingly undetermined to proceed. At last he struck the Captain on the back of the head with a club, and then precipitately retreated. The latter staggered a few paces, and then fell on his hand and one knee, and dropped his musket. Before he could recover himself another Indian stabbed him with a dagger in the neck, though still without putting an end to his life. He then fell into a pool of water knee-deep, where others crowded upon him; but still he struggled violently with them, got up his head, and looked towards the pinnacle as if soliciting assistance. The boat was not above five or six yards distance; but such was the confused and crowded state of the crew, that no assistance could be given him. The Indians then got him under again, but in deeper water, though he still continued to struggle, and once more got his head up; but being quite spent, he turned towards the rock as if to support himself by it, when a savage struck him with a club, which probably put an end to his life, as he was never seen to struggle any more. The savages hauled his lifeless body upon the rocks, and used it in the most barbarous manner, snatching the daggers out of one another's hands, in order to have the pleasure of mangling it. If any thing could add to the misfortune of this celebrated navigator's death, it was, that even his mangled remains were not saved from the hands of the barbarians. The lieutenant already mentioned, who, by his removing to a distance when he ought to have come on shore, seemed to have been the occasion of his death, returned on board without making any attempt to recover his body; though it appeared from the testimonies of four or five midshipmen who arrived soon after at the fatal spot, that the beach was almost deserted by the Indians, they having at last yielded to the continual fire from the boats. The officer alleged in his own excuse for removing at first from the shore, that he mistook the signals; but be this as it will, the complaints against him were so many and so great, that Captain Clerke was obliged publicly to take notice of them, and to take the depositions of his accusers in writing.—These papers, however, were not found, and it is supposed that the Captain's bad state of health had induced him to destroy them. After all we are informed, that, in the opinion of Captain Philips, who commanded the marines, it is very doubtful whether any effectual relief could have been given to the commander, even if no mistake had been committed on the part of the lieutenant. The author of all the mischief was Pareah, the chief already mentioned, who had employed people to steal the boat in the night-time. The

king was entirely innocent both of the theft and the murder of Captain Cook; but the latter was perpetrated by some chiefs who were his near relations. The chief who first struck him with a club was named *Karimans raba*, and he who stabbed him with the dagger was called *Nooah*. The latter, Mr Samwell, from whose narrative this account is taken, observes, was stout and tall, had a fierce look and demeanour, and united in his person the two properties of strength and agility more than he had ever observed in any other person.—Both of them were held in great estimation by their countrymen on account of the hand they had in his death.

By reason of the barbarous disposition of the Indians, it was found impossible to recover Captain Cook's body after the first opportunity already mentioned was lost. By dint of threats and negotiations, however, some of the principal parts were procured with great difficulty; by which means the navigators were enabled to perform the last offices to their much respected commander. These being put into a coffin, and the service read over them, were committed to the deep with the usual military honours on the 21st of February 1779. Soon after his death a letter was issued by M. de Sartine, secretary to the marine department of France, and sent to all the commanders of French ships, importing, that Captain Cook should be treated as the commander of a neutral and allied power; and that all captains of armed vessels who might meet with him, should make him acquainted with the king's orders, but at the same time let him know, that on his part he must refrain from hostilities. This humane and generous proceeding, with regard to France, originated from Mr Turgot; but the thought seems first to have struck Dr Franklin. Thus much at least is certain, that the doctor, while ambassador from the United States, wrote a circular letter to the American naval commanders something to the purport of that already mentioned; but in this he was not supported by Congress; for an edict was instantly issued, that special care should be taken to seize Captain Cook if an opportunity of doing it occurred. The Spaniards proceeded in the same manner, and both acted on a principle equally mean and absurd, that the obtaining a knowledge of the western coast of America, or of a northern passage into the Pacific Ocean, might be attended with some bad consequence to their respective states.

Captain Cook was a man of plain address and appearance, but well looked, and upwards of six feet high. His head was small, and he wore his hair, which was brown, tied behind. His face was full of expression; his nose exceedingly well shaped; his eyes, which were small and of a brown cast, were quick and piercing; his eye-brows prominent, which gave his countenance altogether an air of austerity. Notwithstanding this, it was impossible for any one to excel him in humanity, as is evident from the whole tenor of his behaviour both to his own people and the many savage nations with whom he had occasion to interfere. This amiable property discovered itself even in the final catastrophe of his life; his utmost care being directed to the preservation of his people, and the procuring them a safe retreat to their boats. And it cannot be enough lamented, that he who took so much

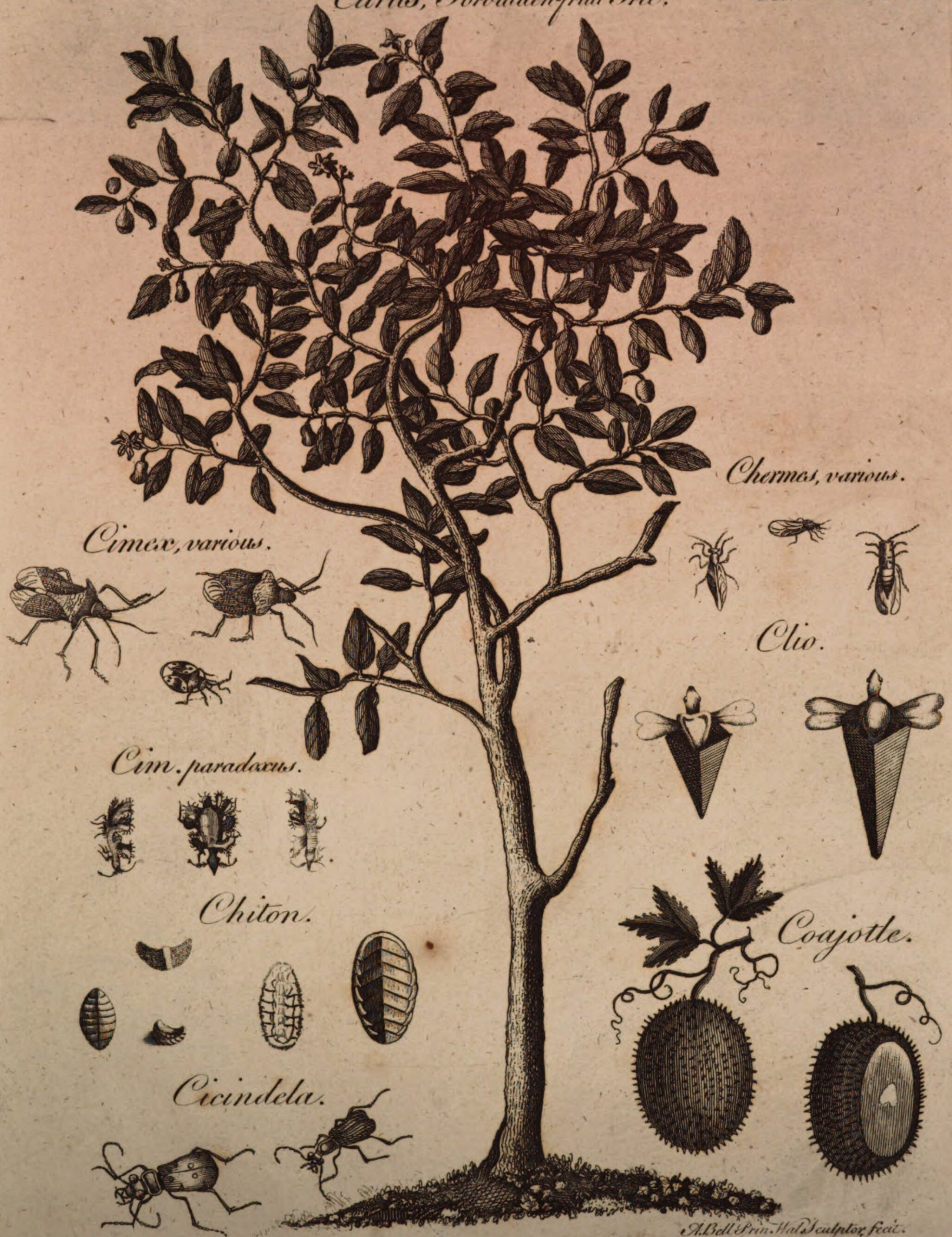


Fig. 3.

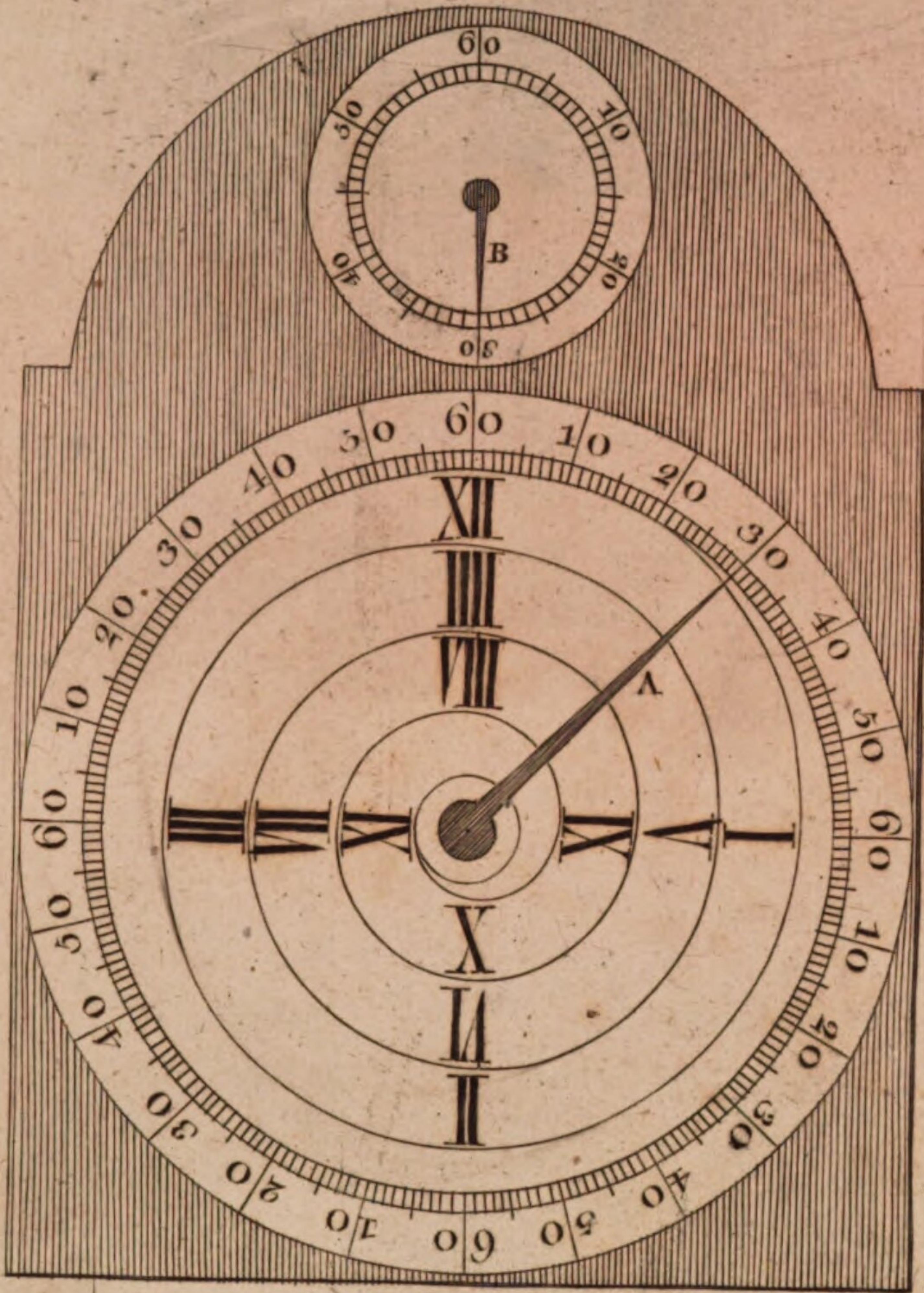


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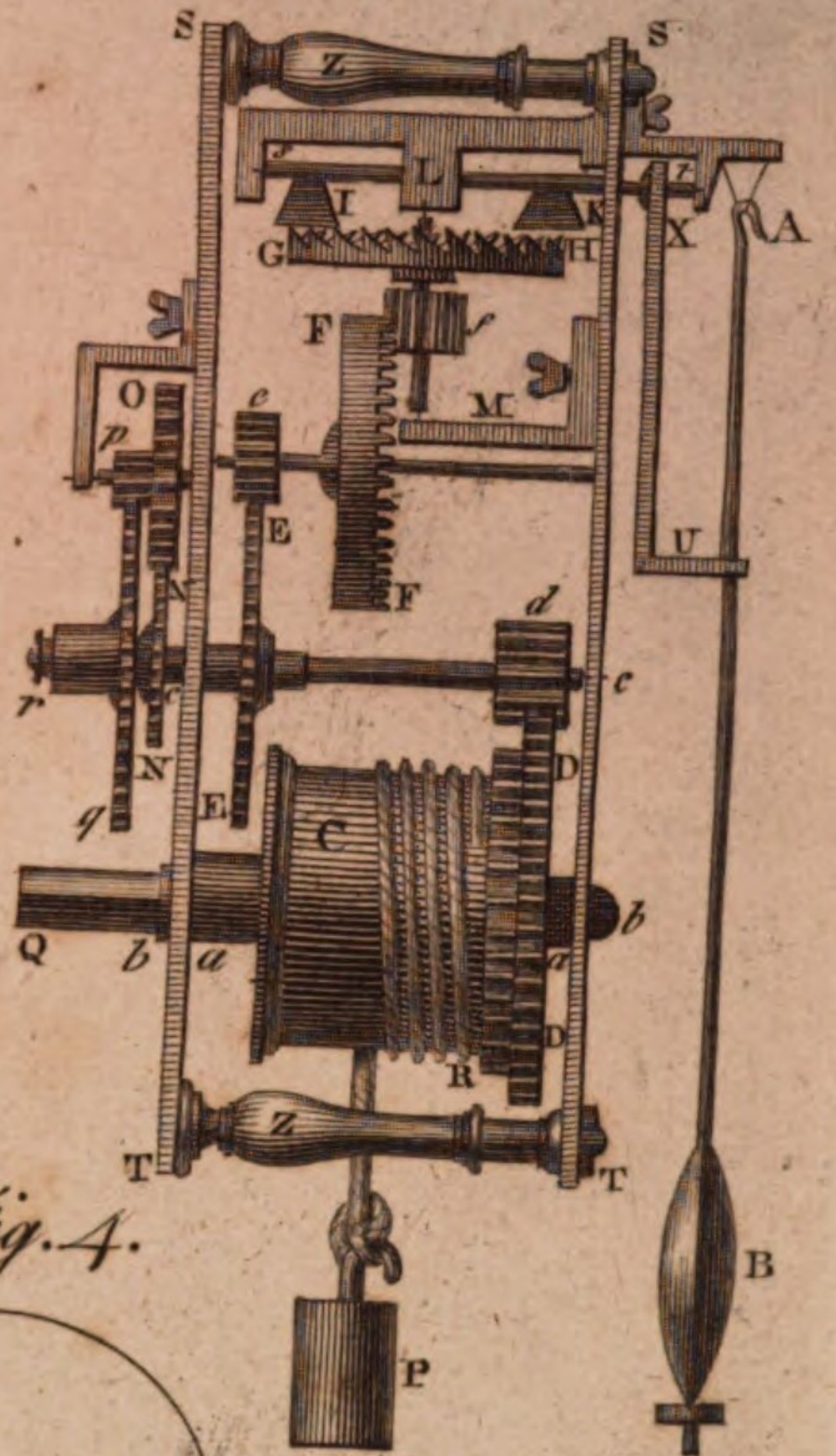


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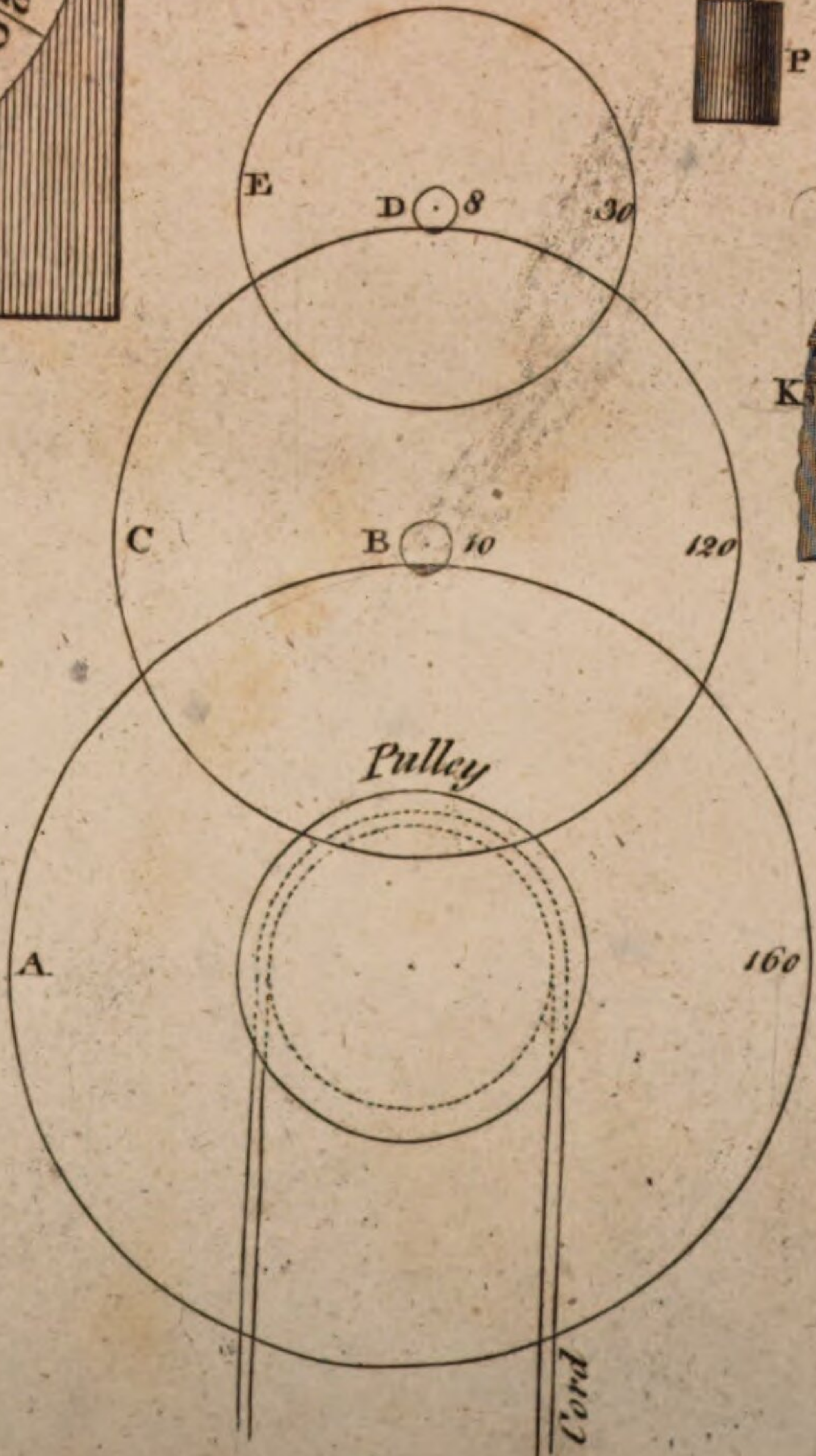


Fig. 2.



Fig. 5.

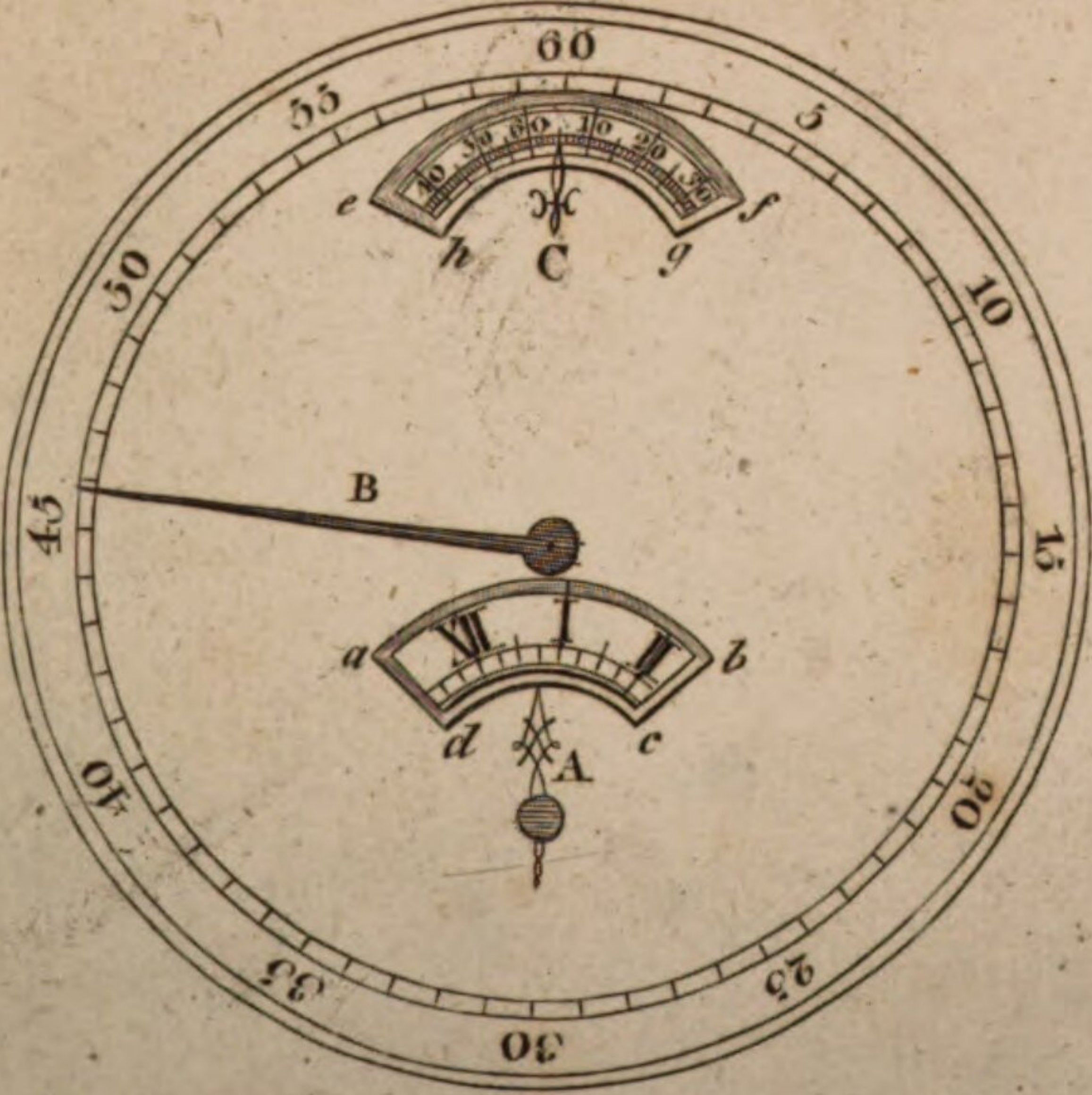


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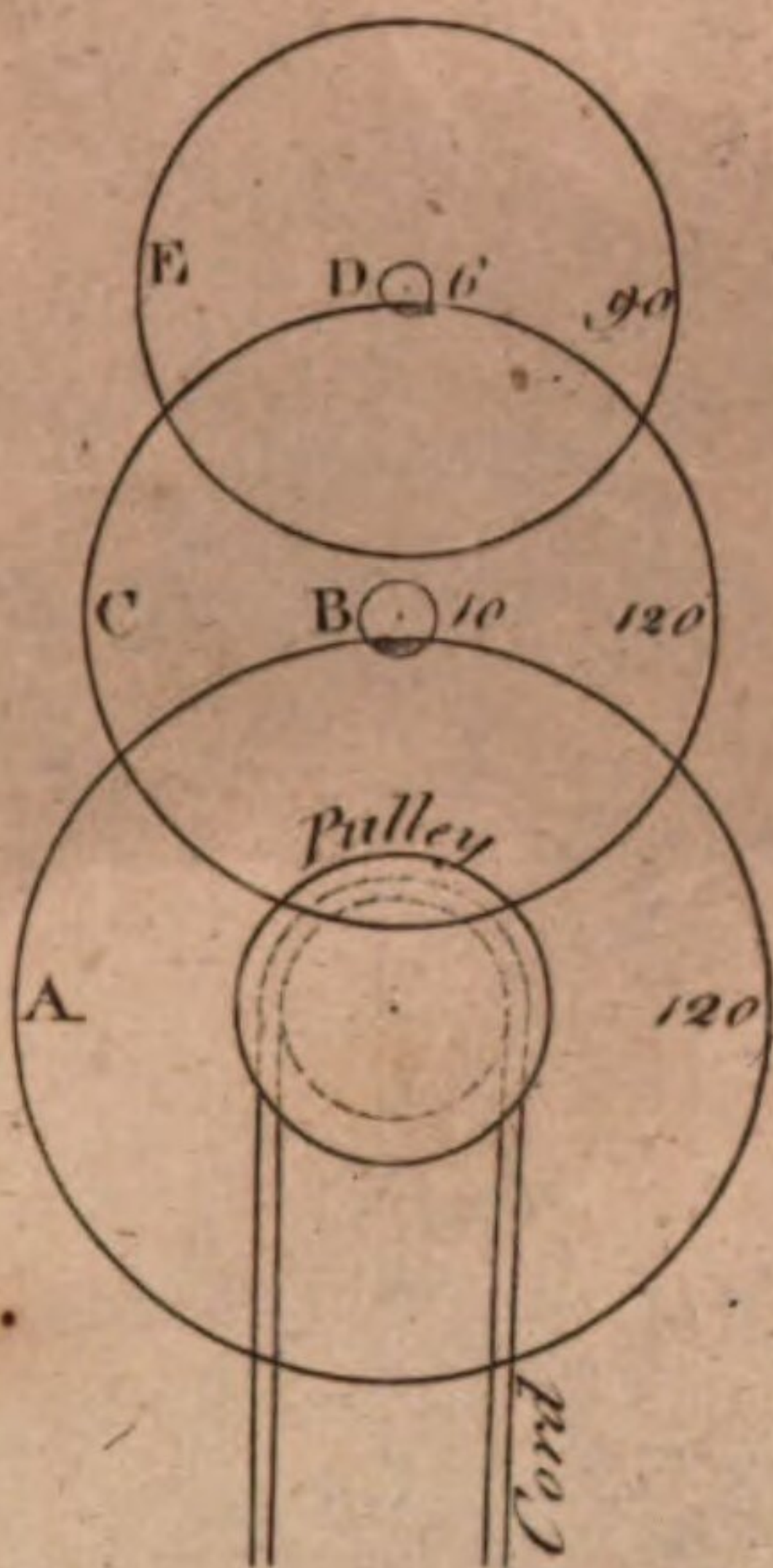


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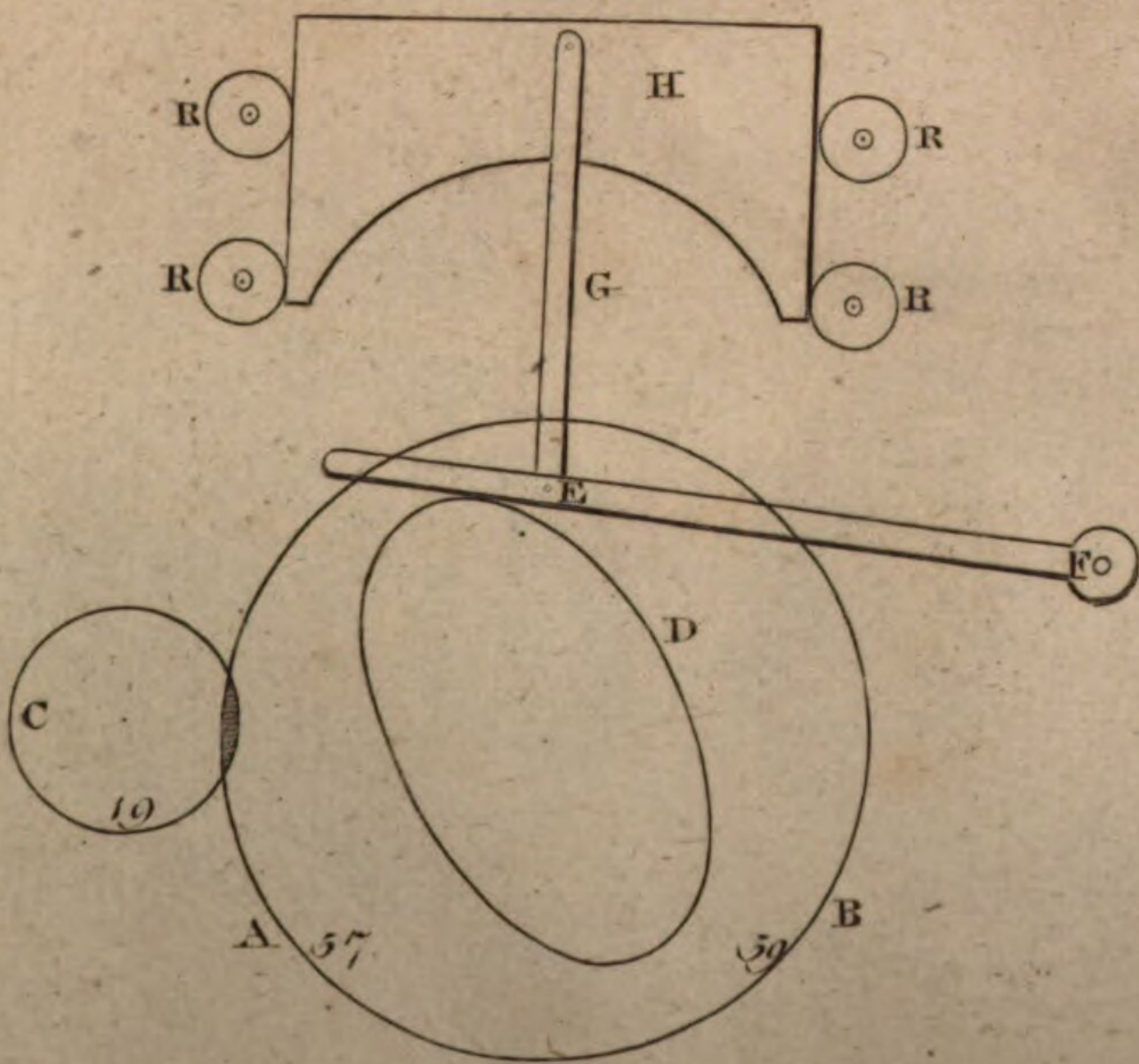


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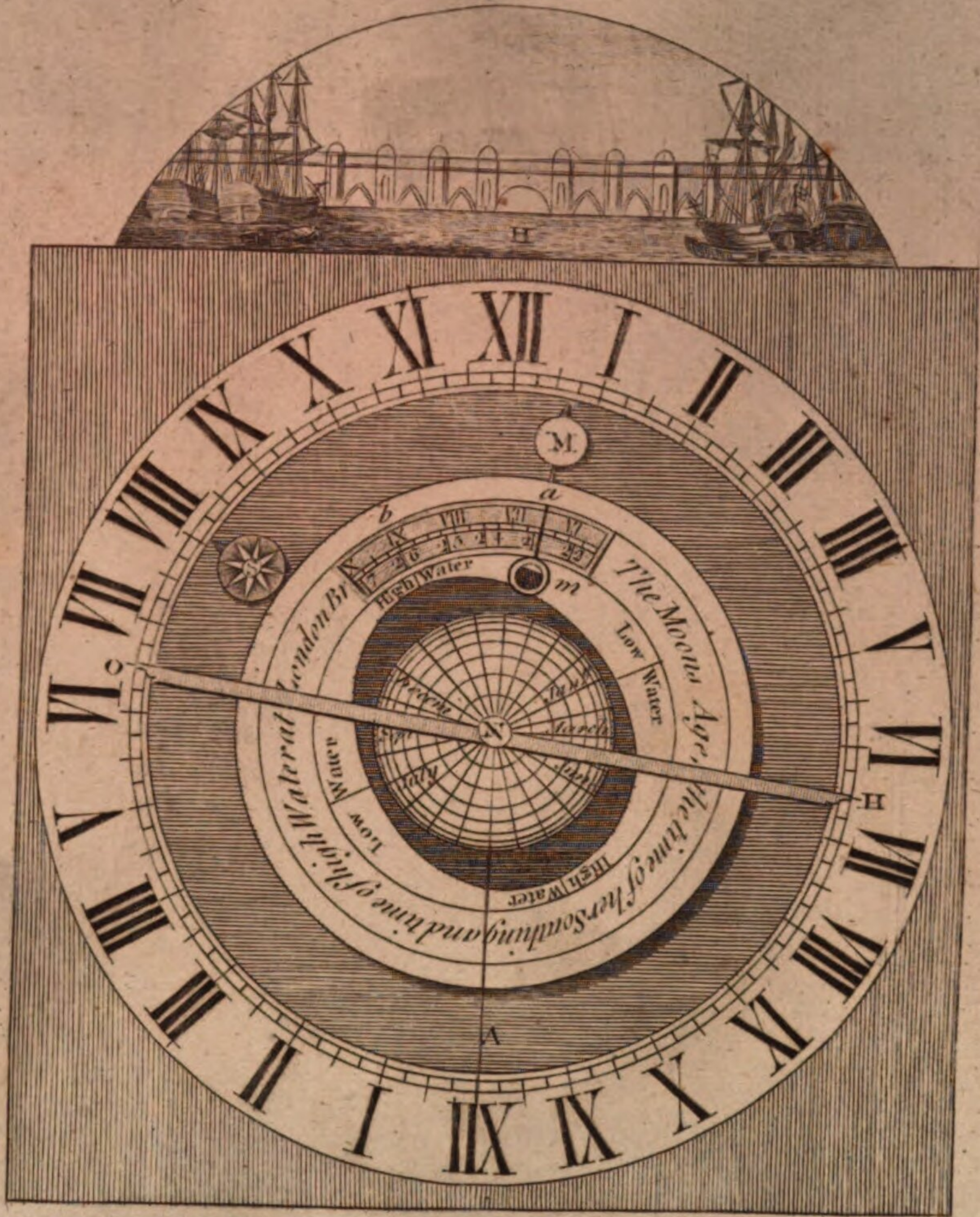
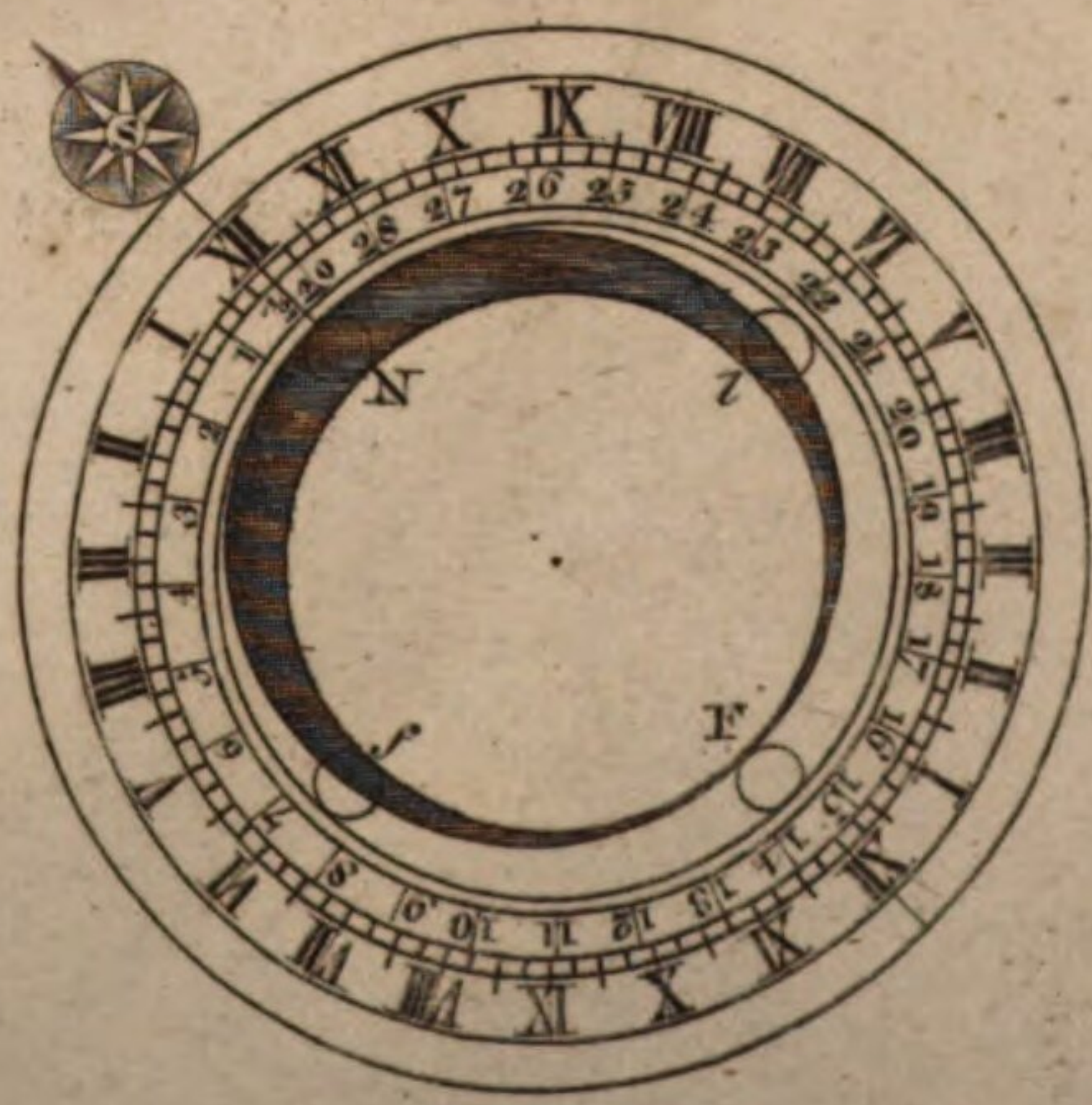


Fig. 8.



A. Bell Prin. W. A. Sculptor fecit.

Fig. 14.

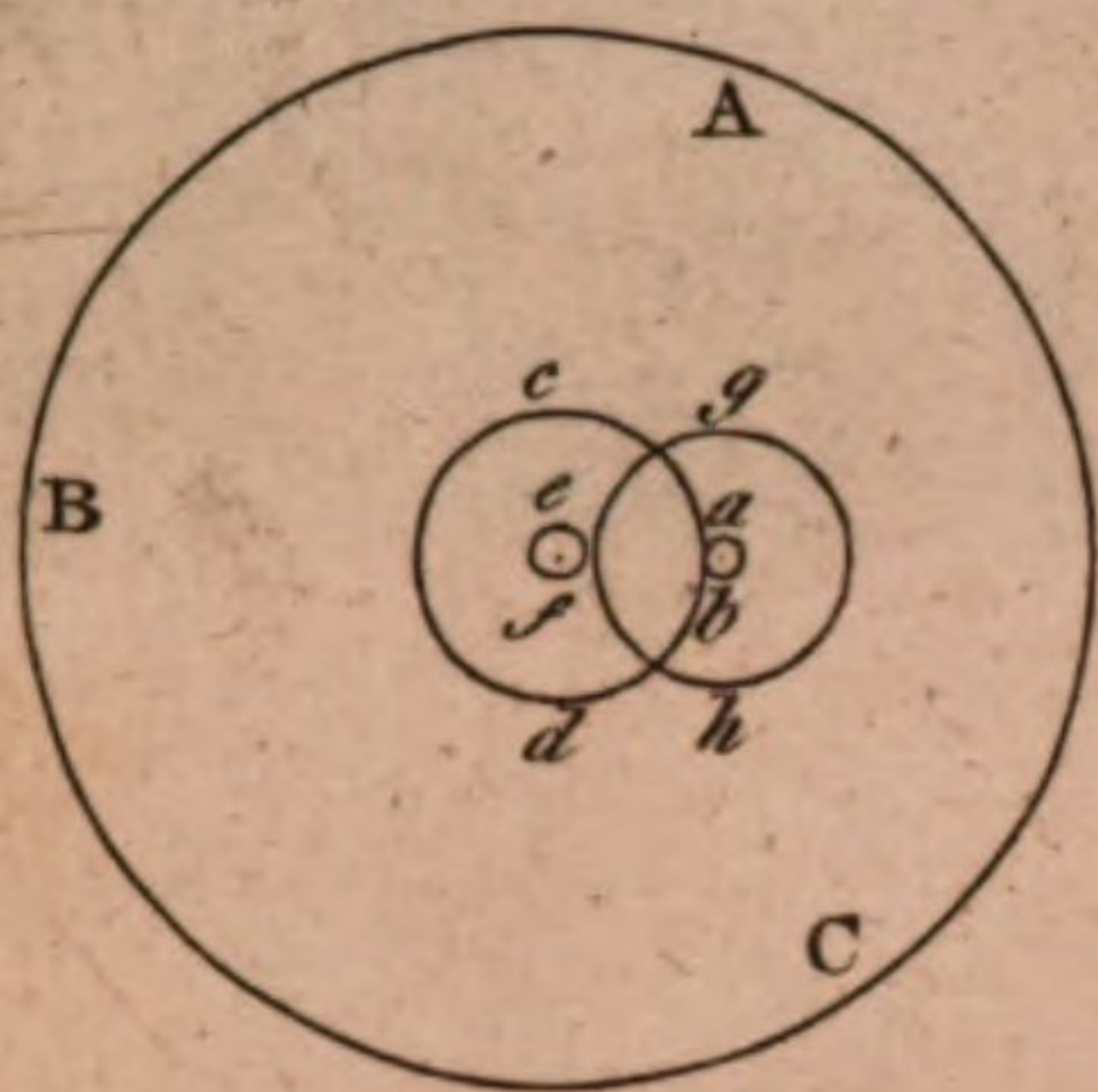


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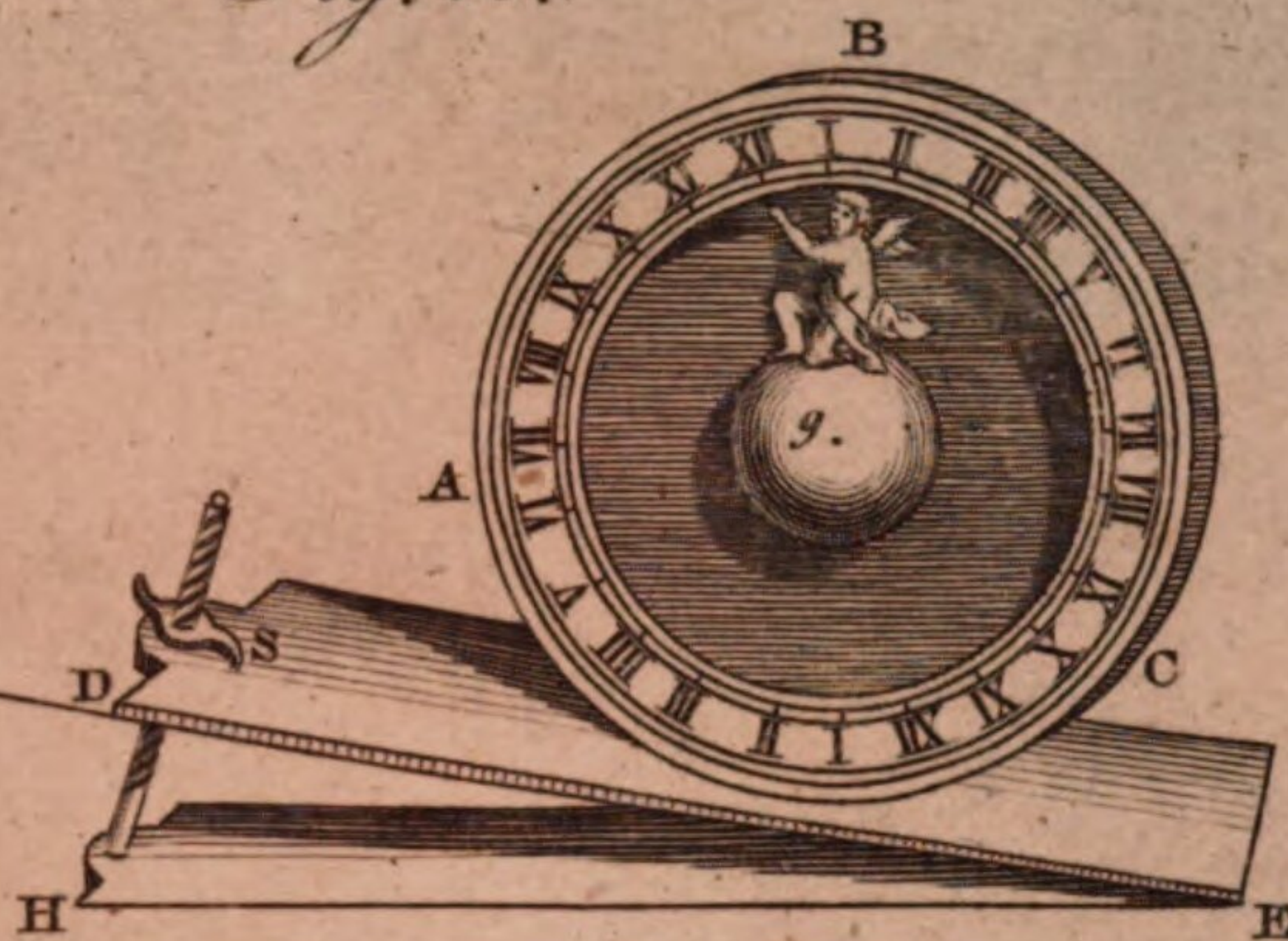
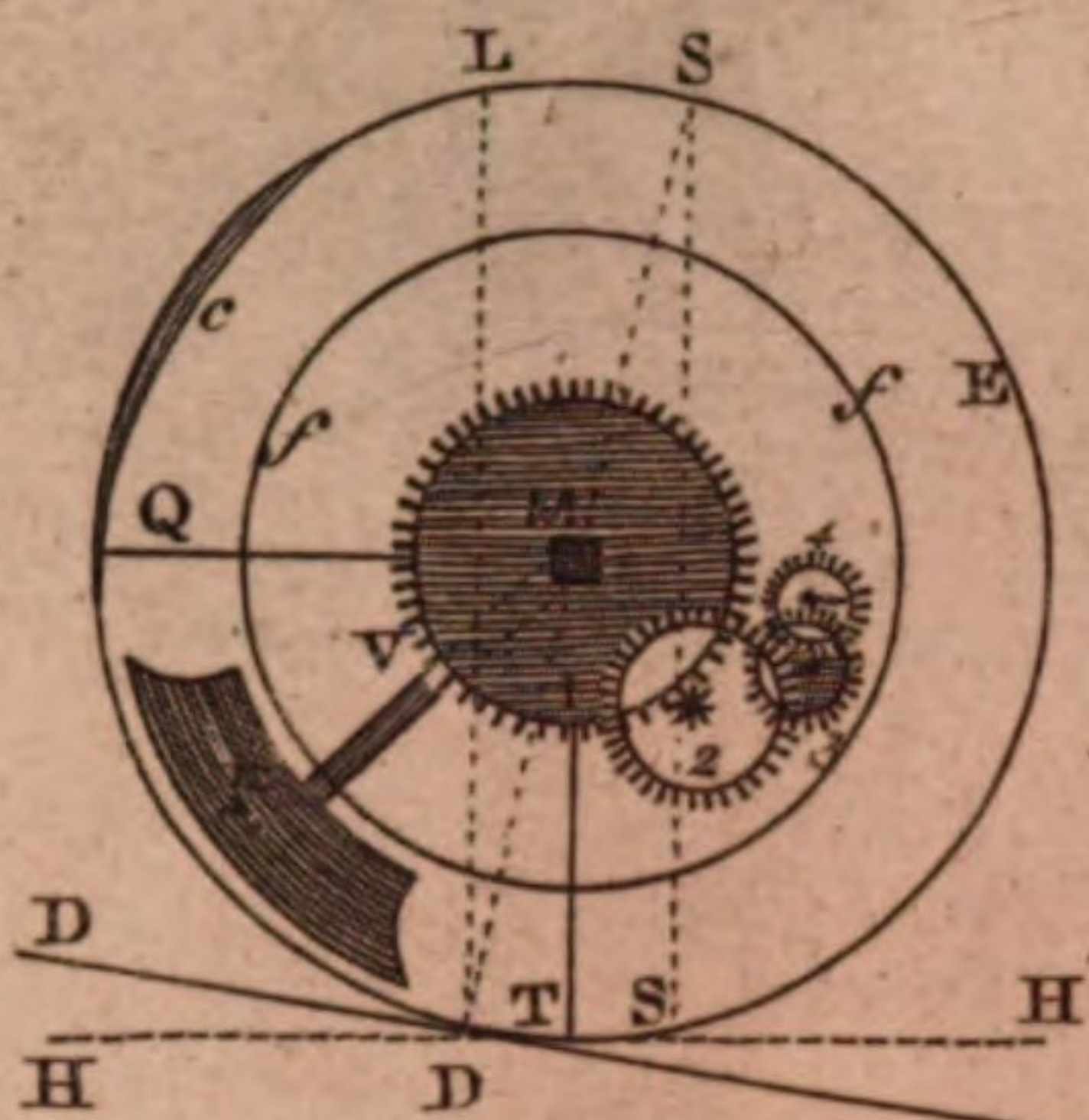


Fig. 13.

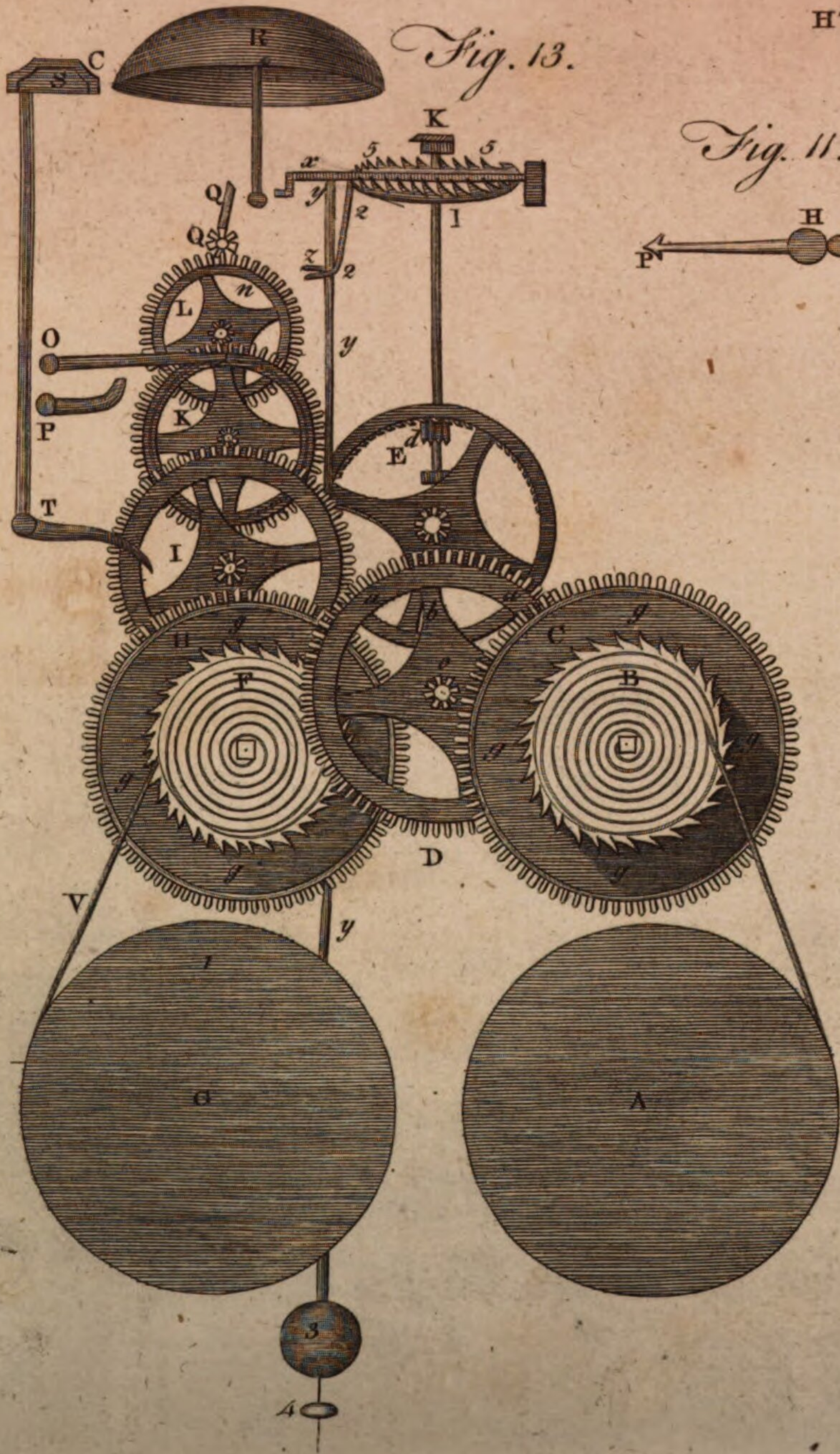


Fig. 11.



Fig. 12.

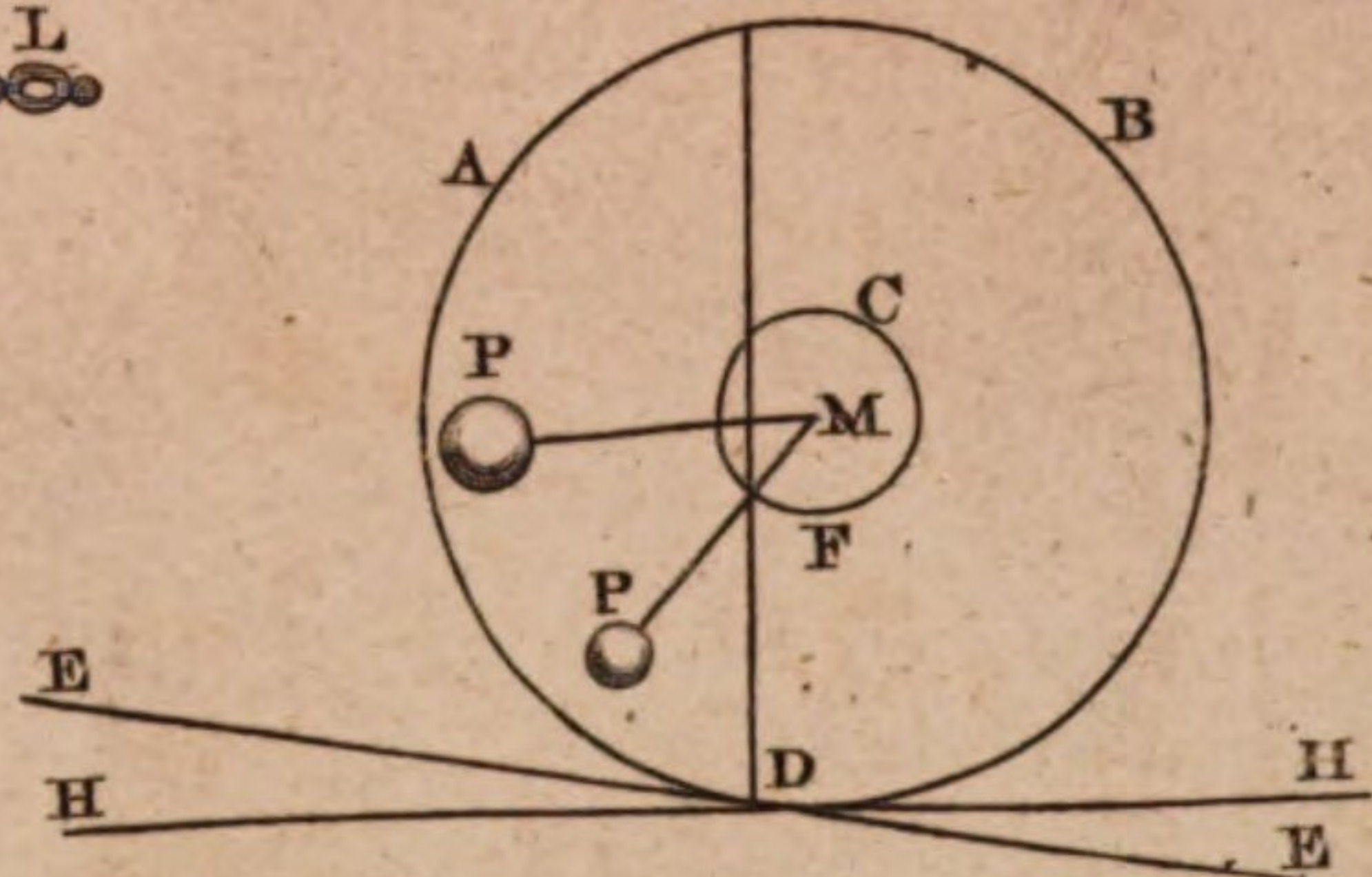
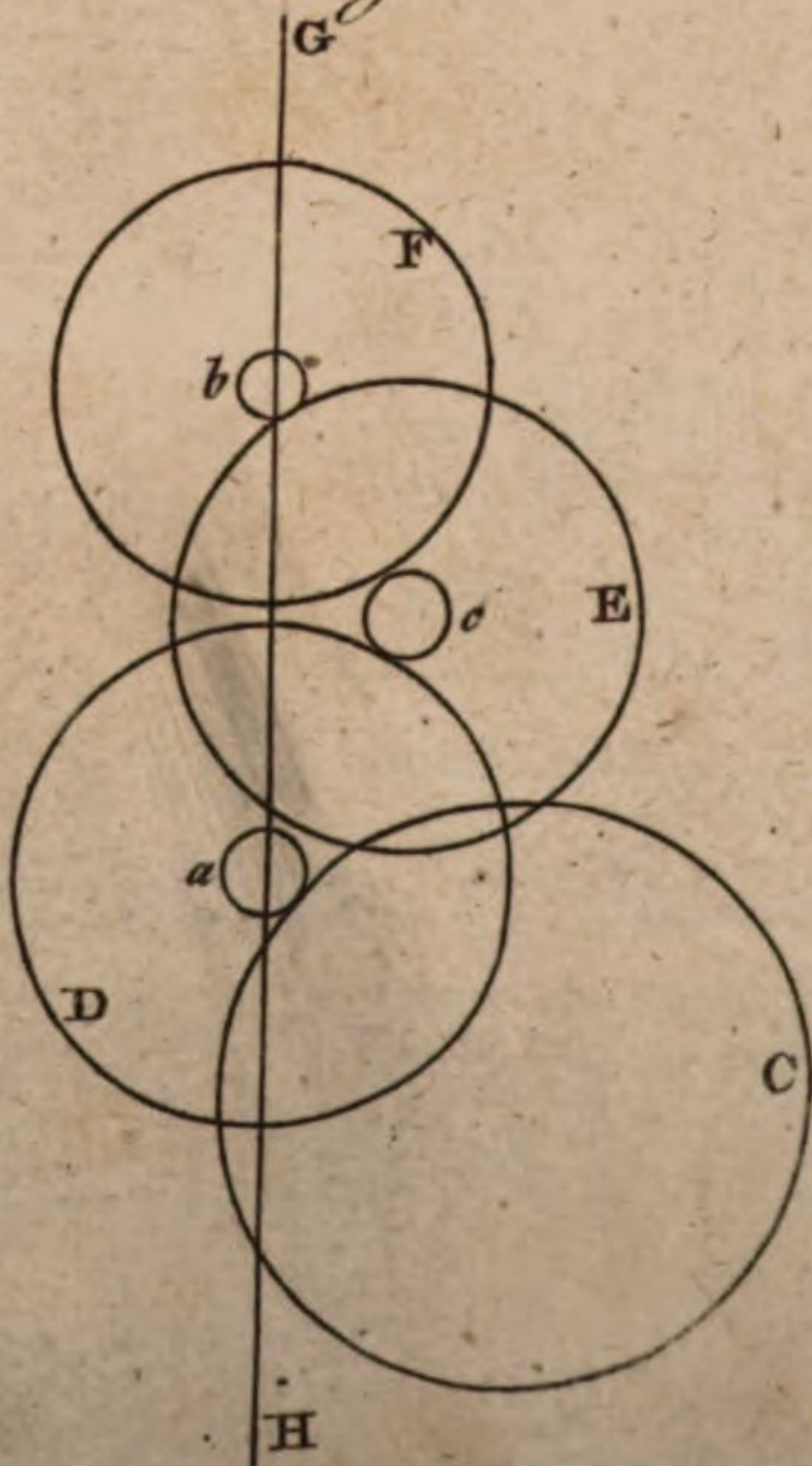
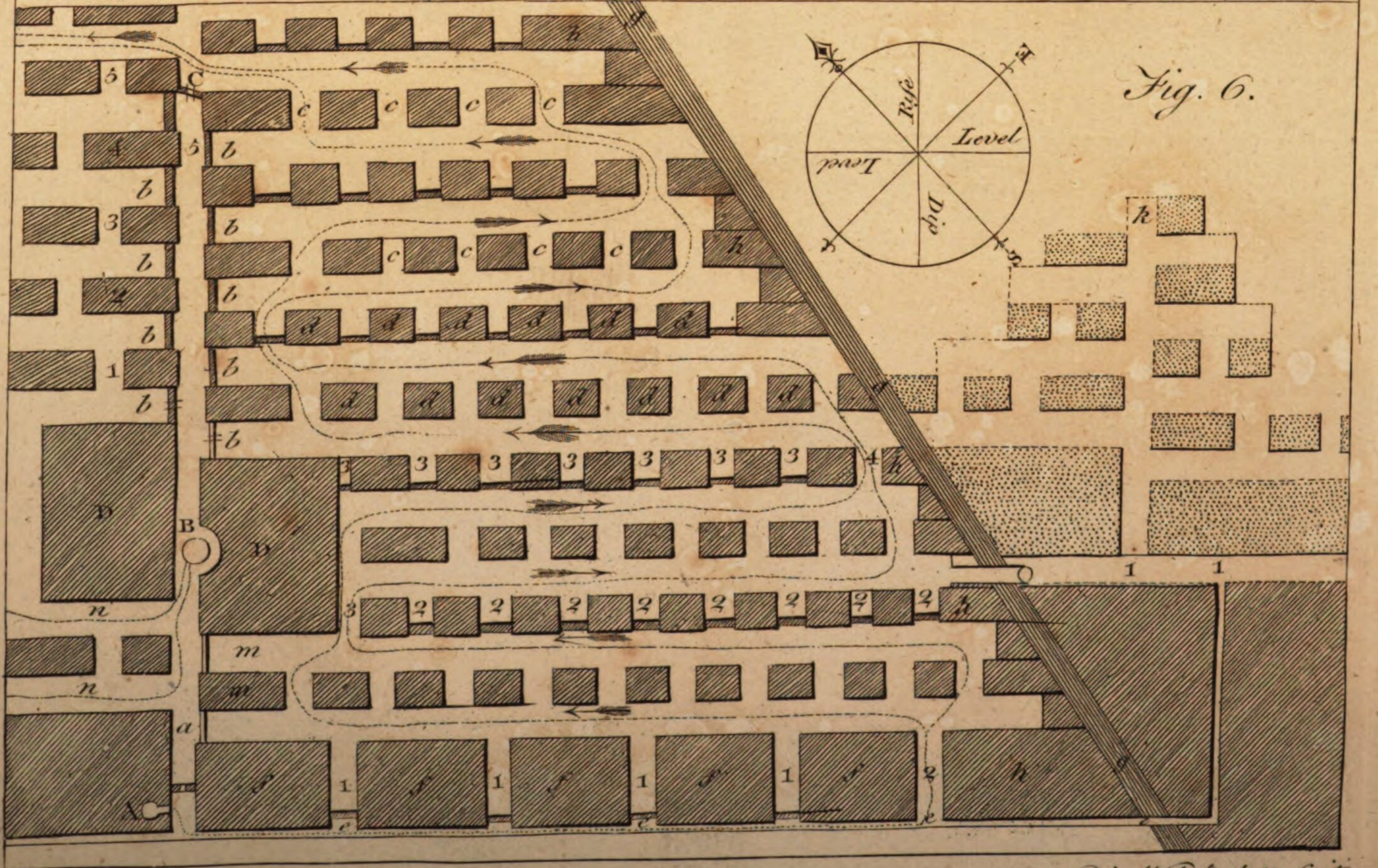
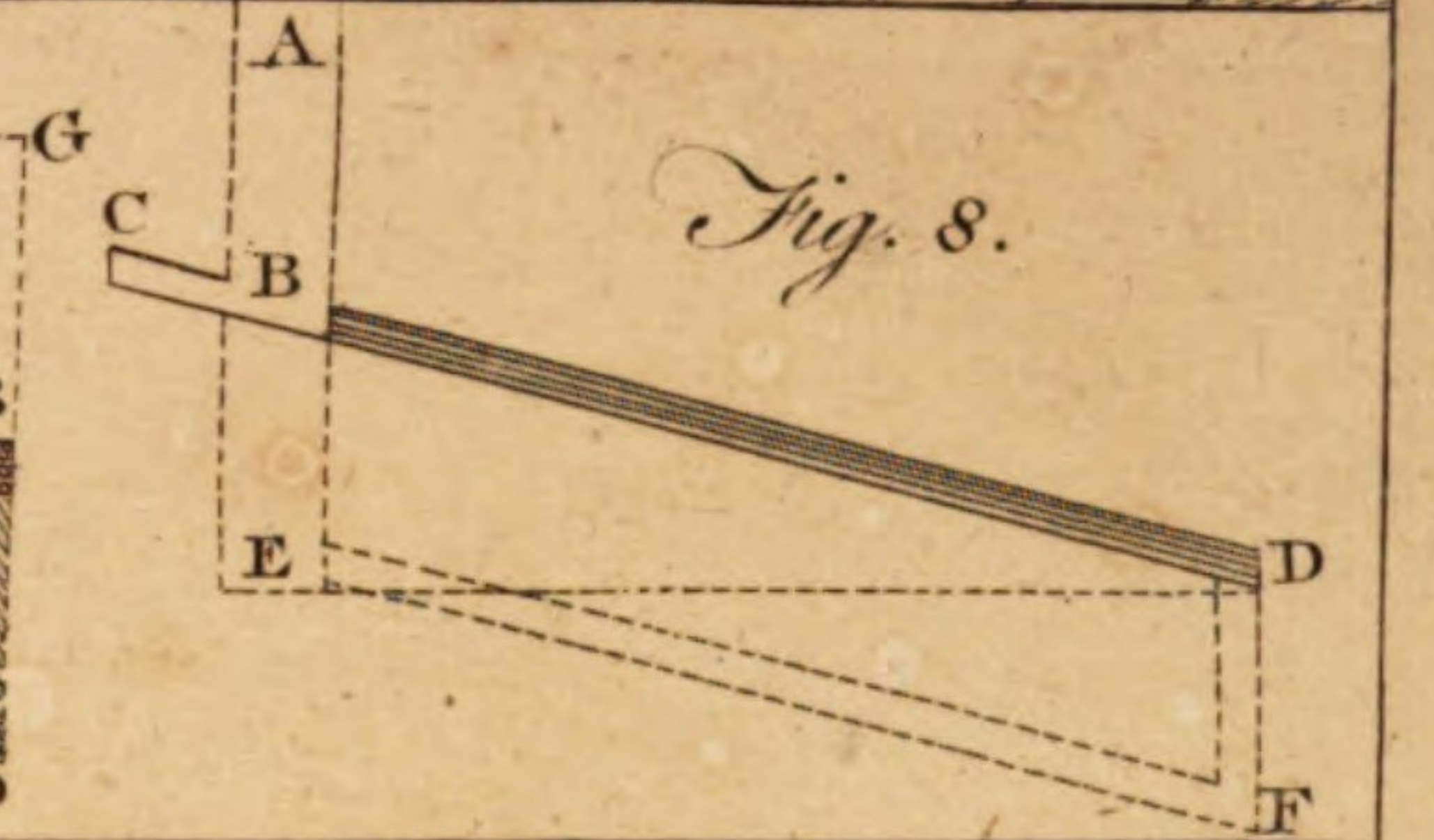
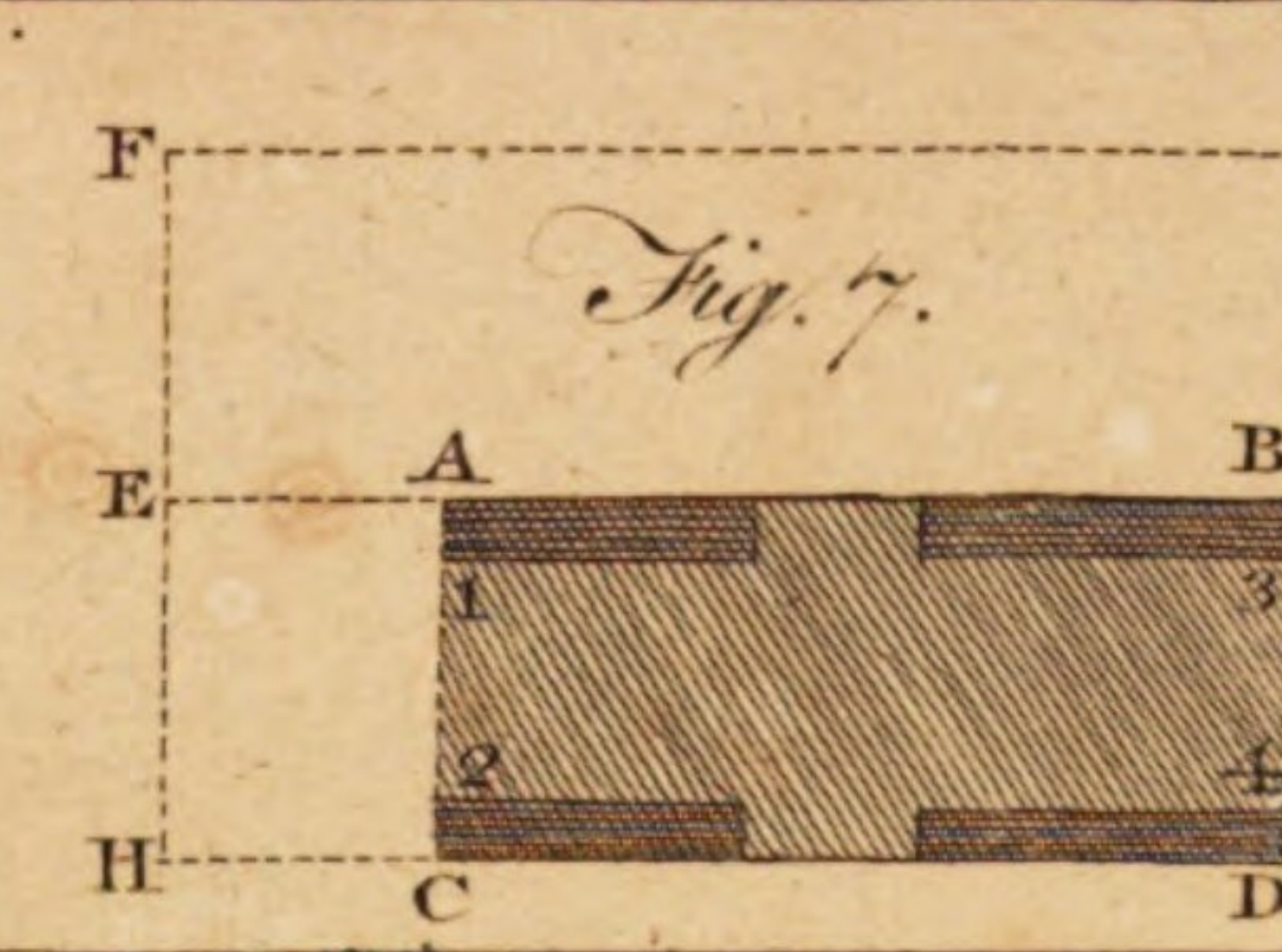
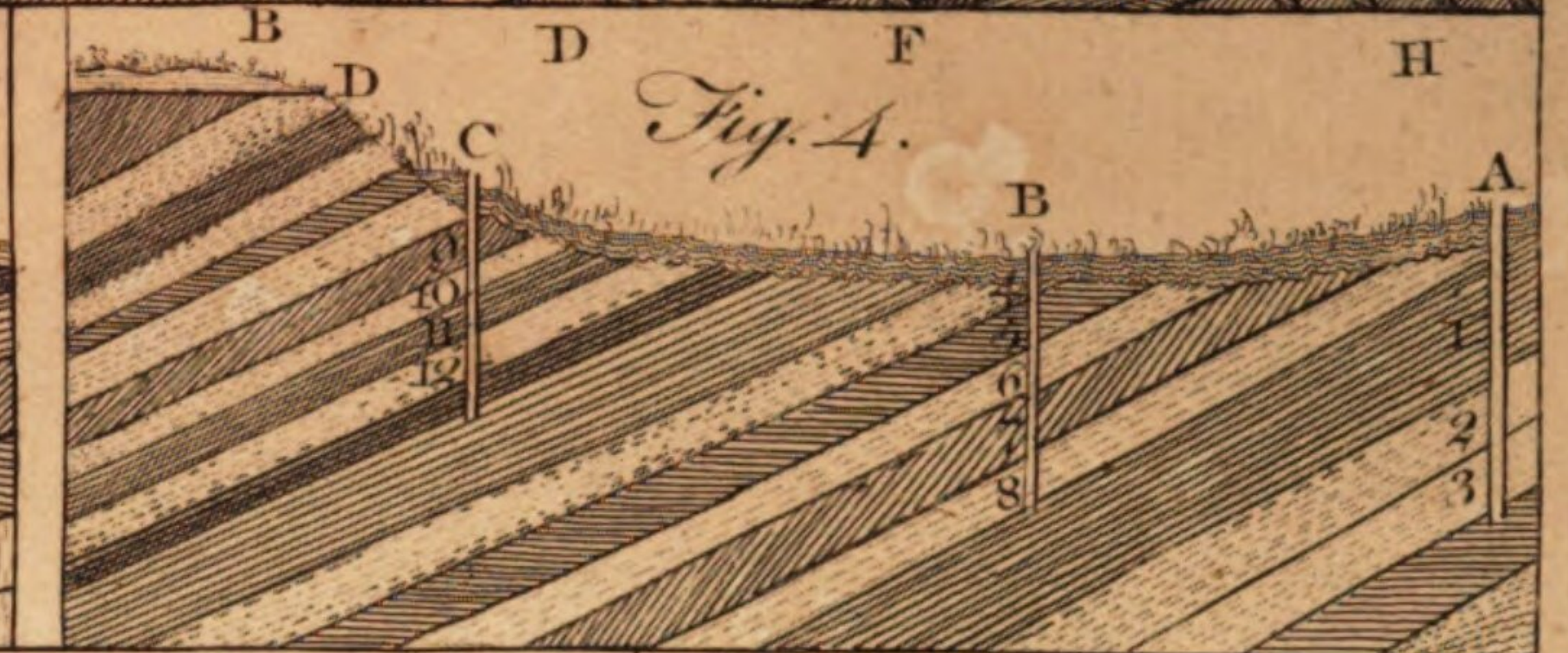
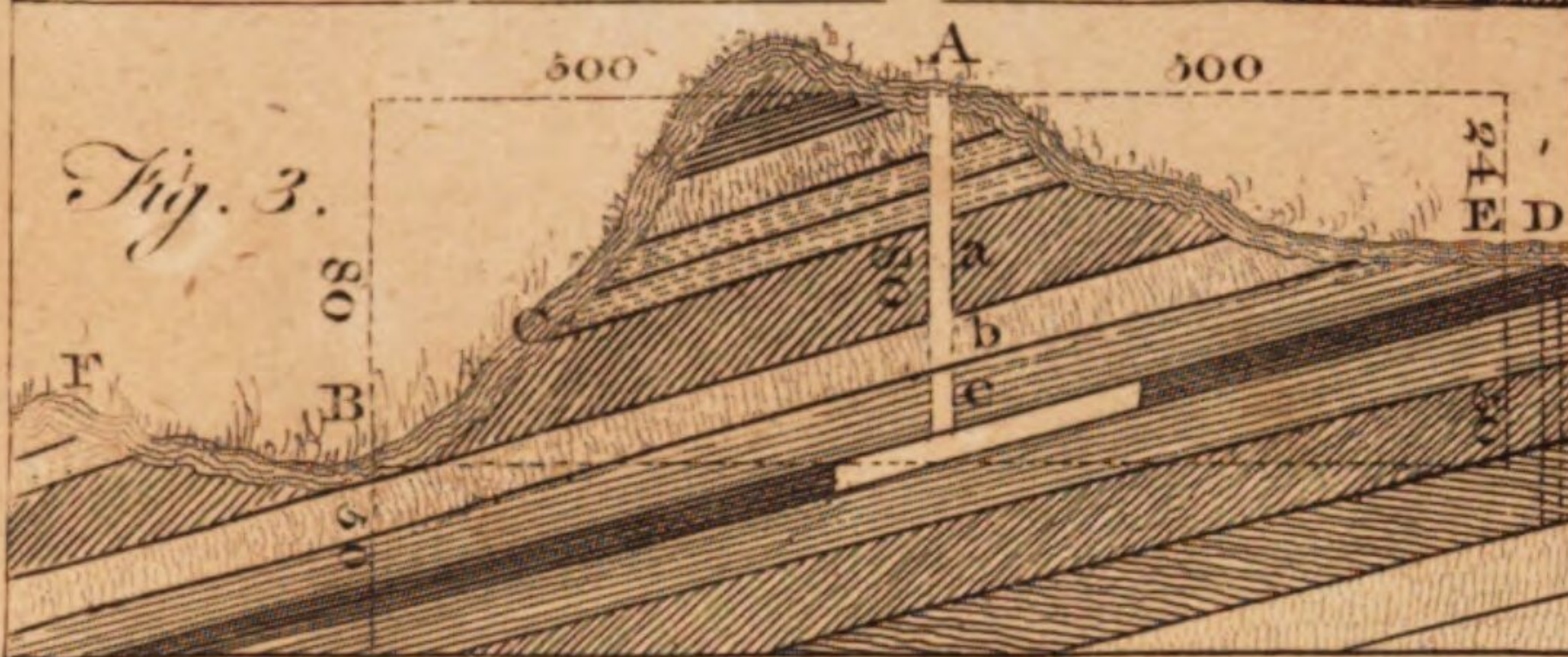
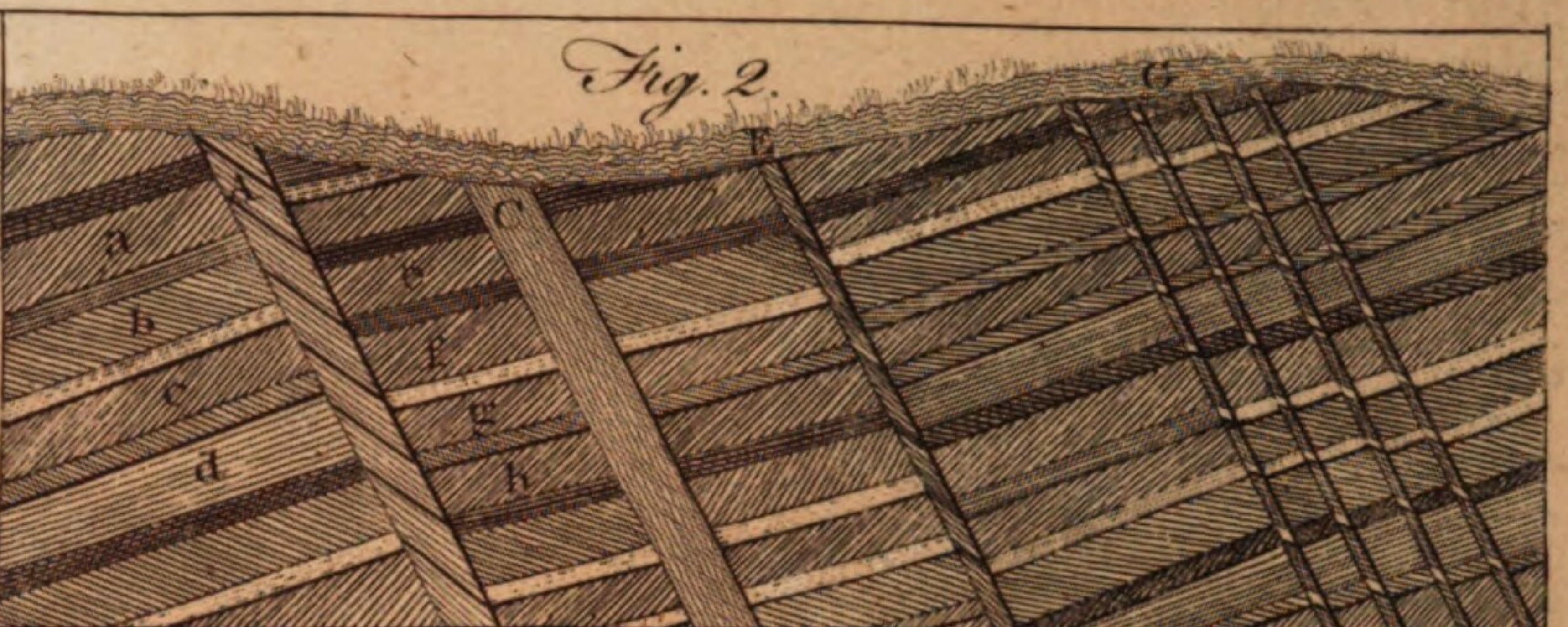
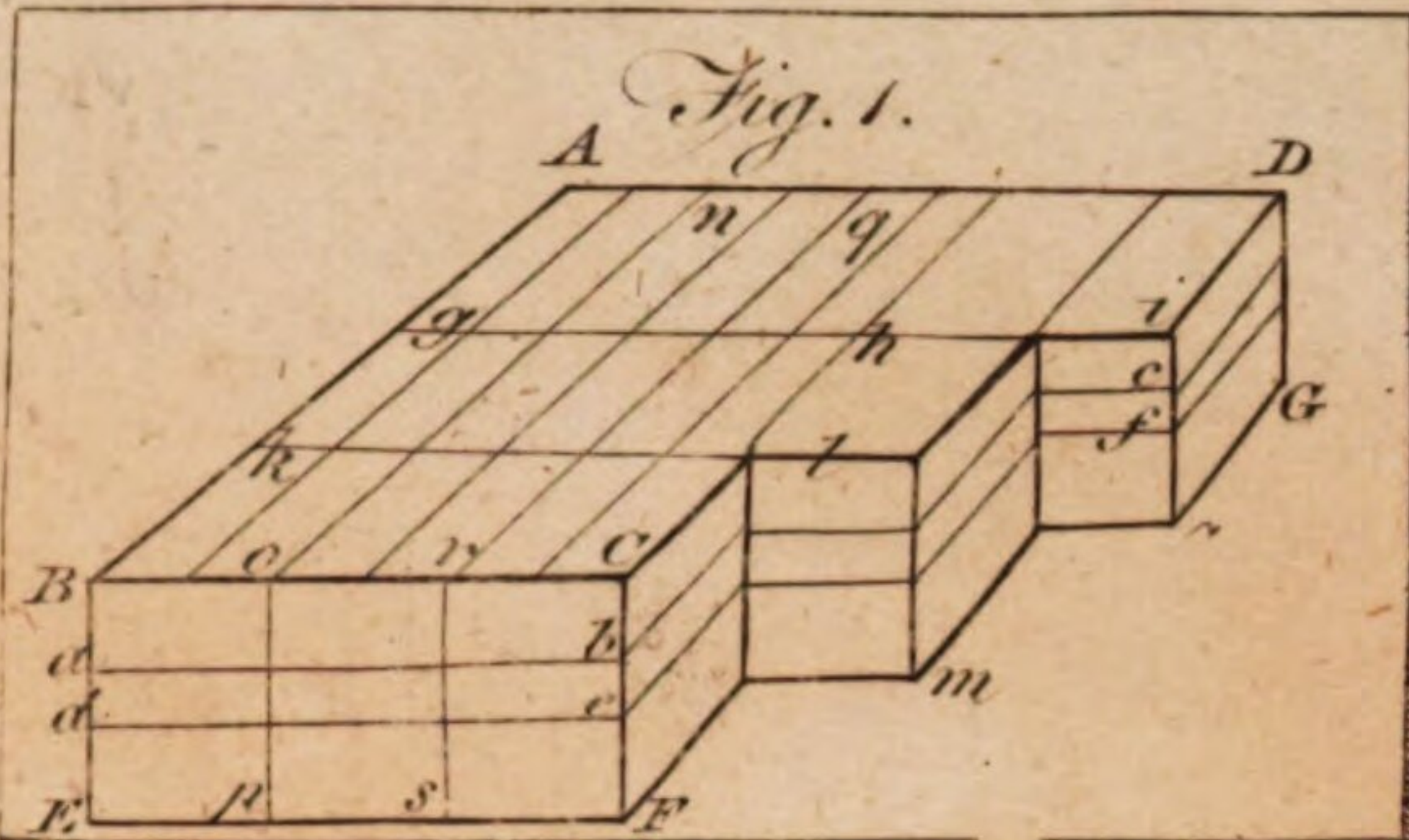


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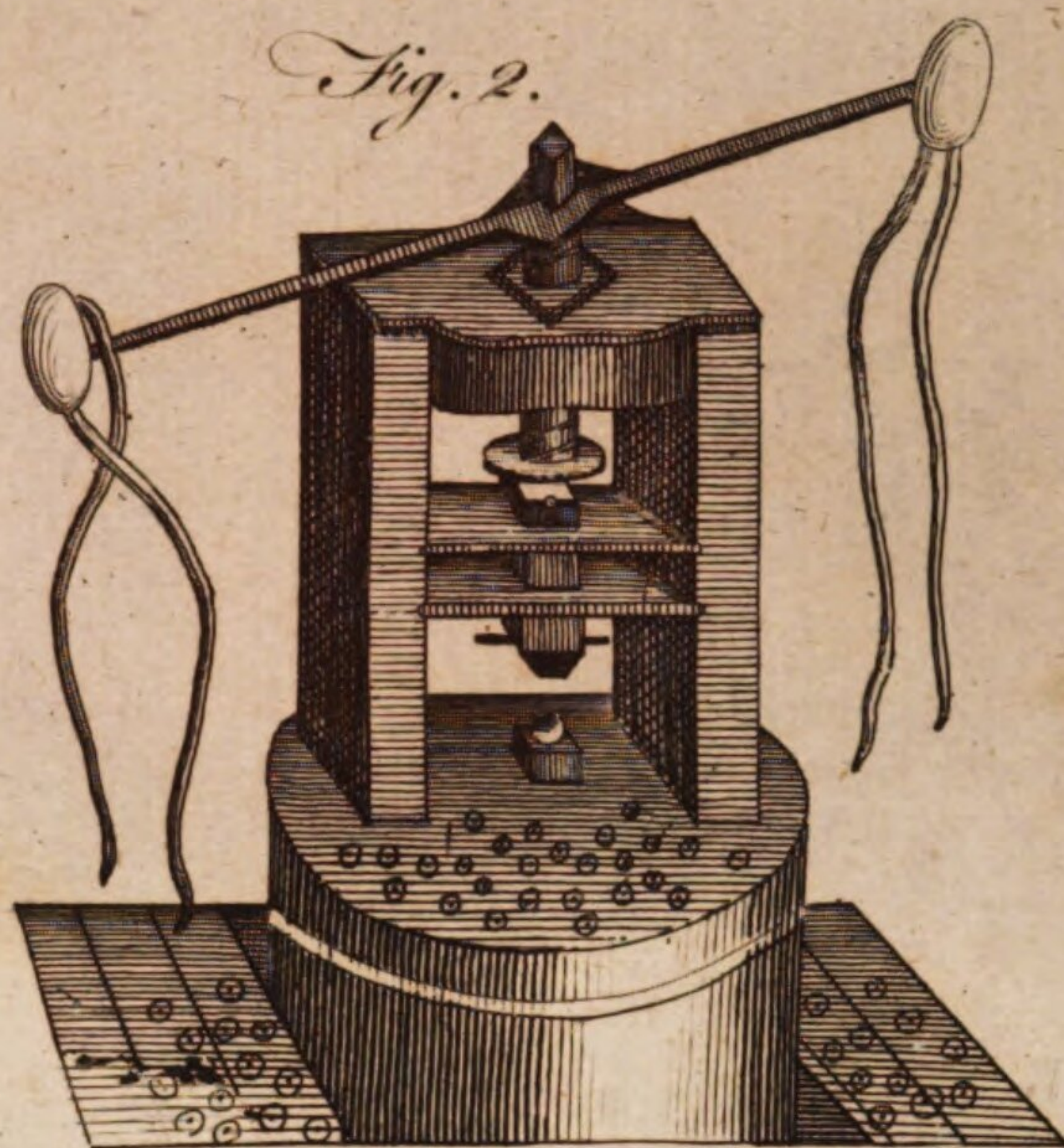


A Bell Prin. Walsculpter fecit.





Coccus hesperidum.



COMPASS.

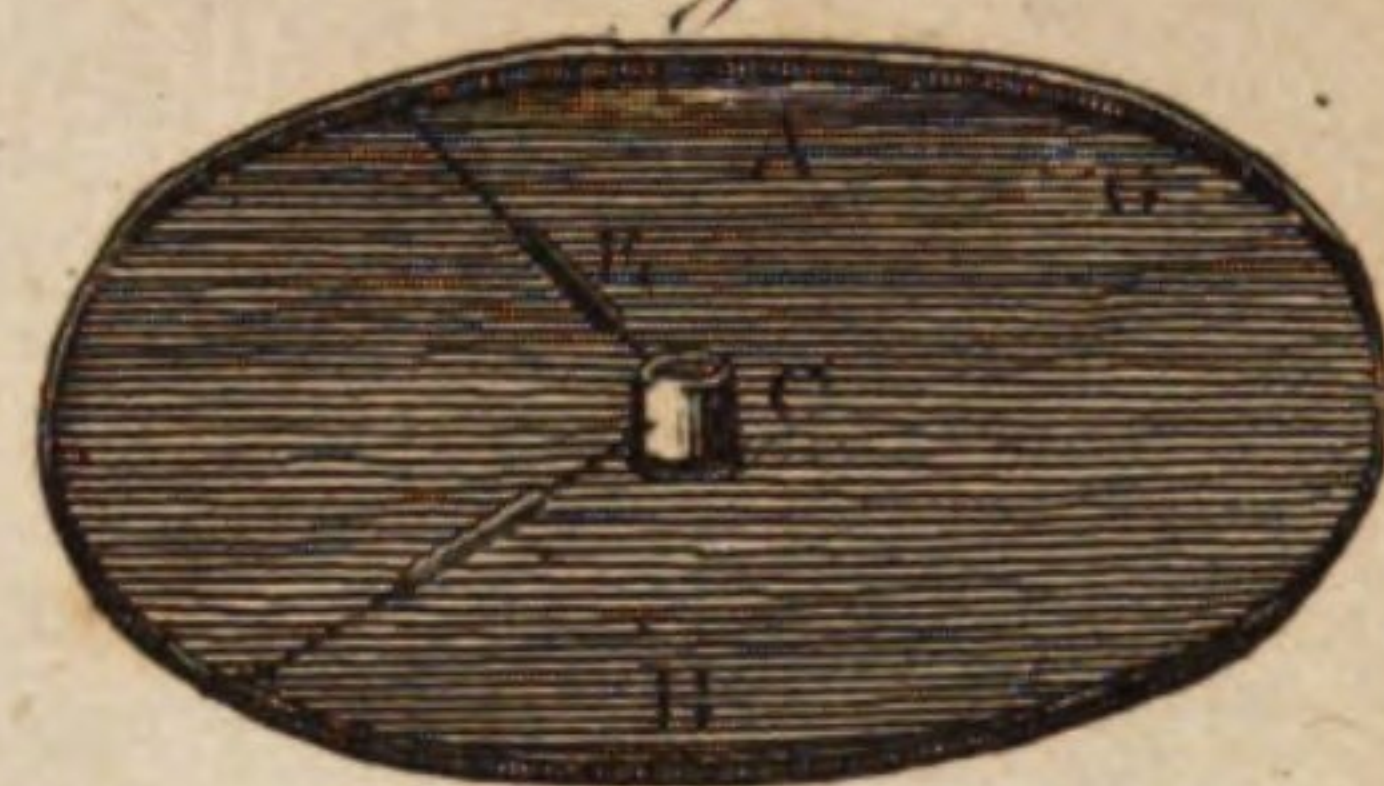
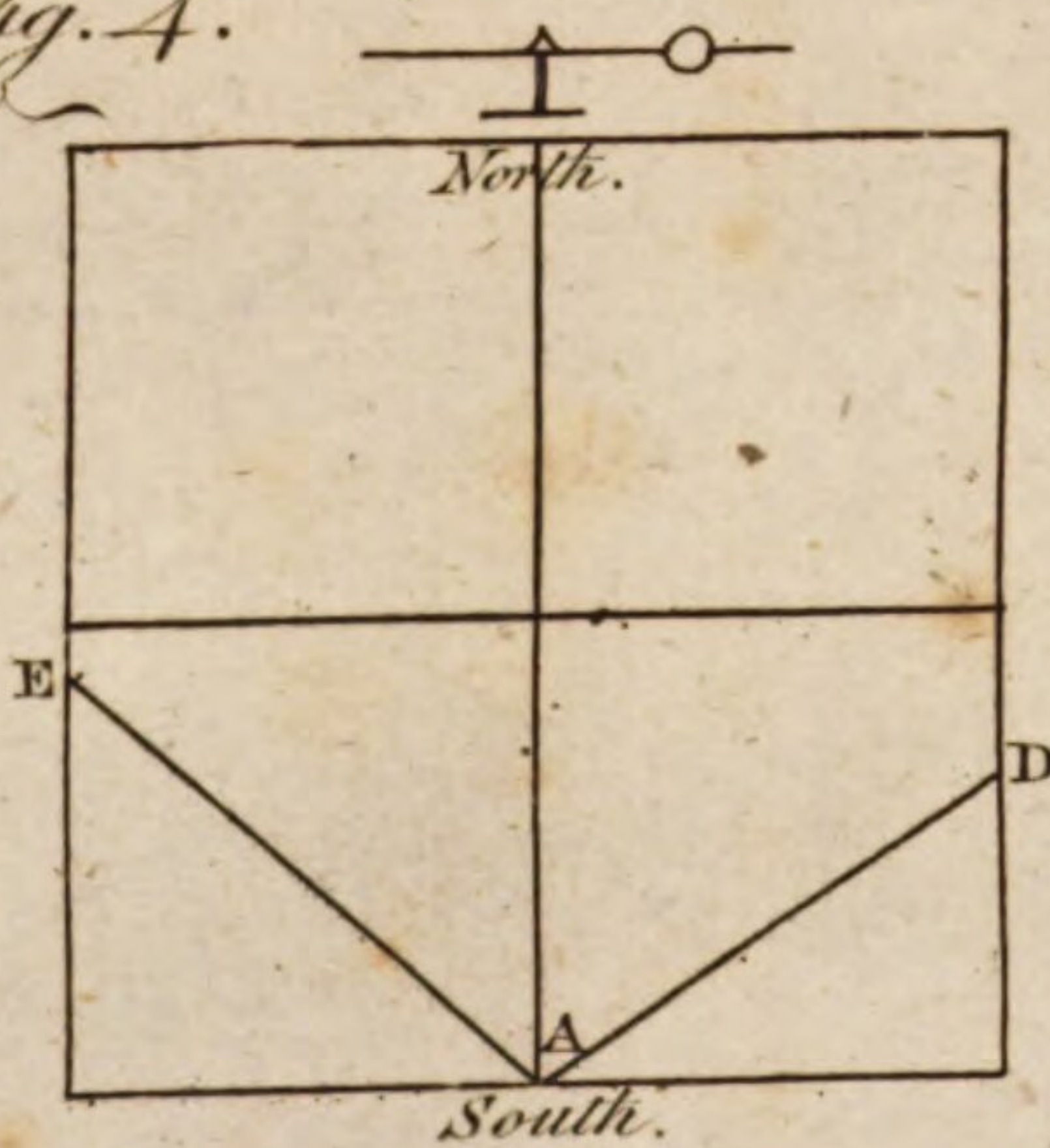
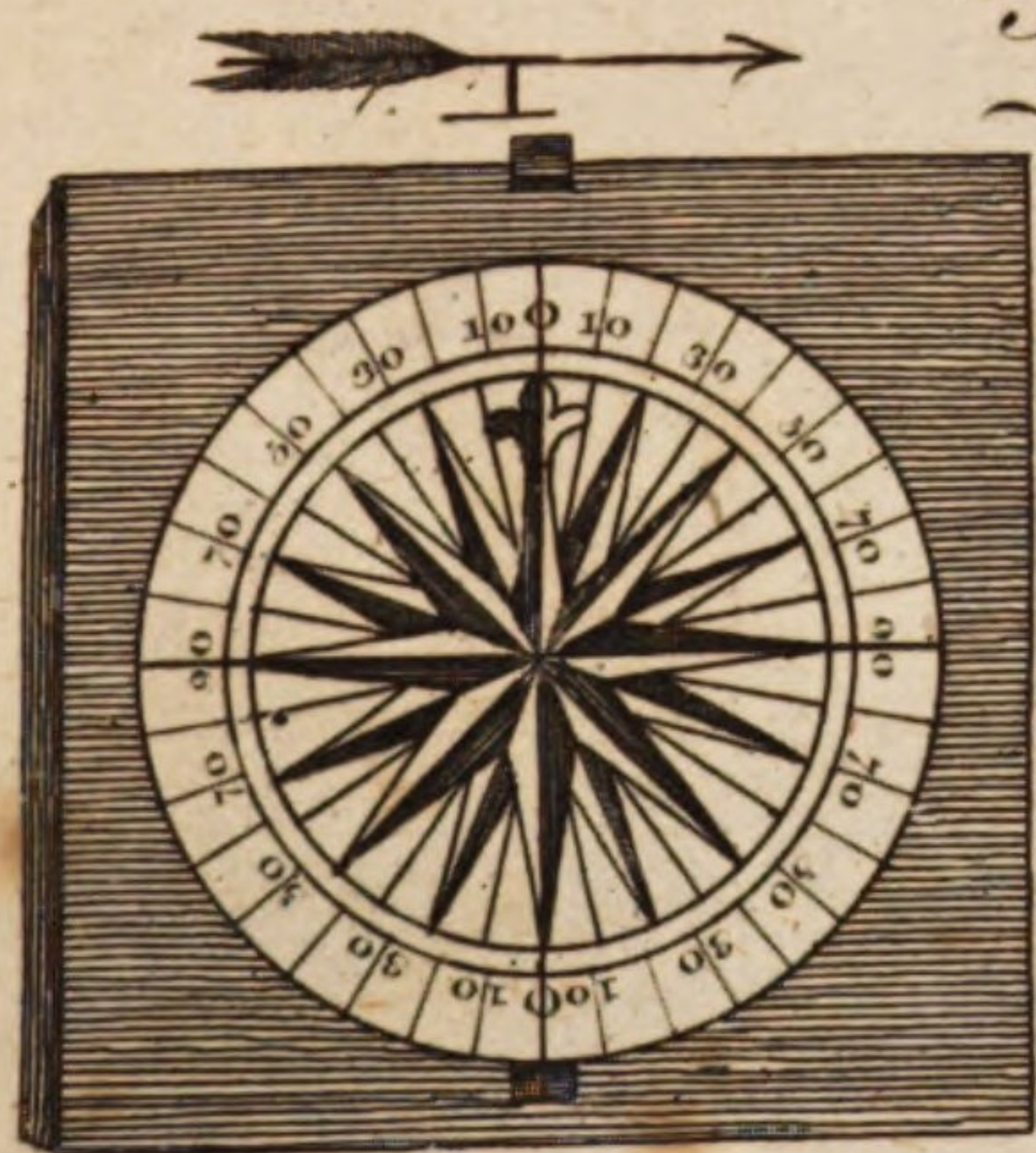
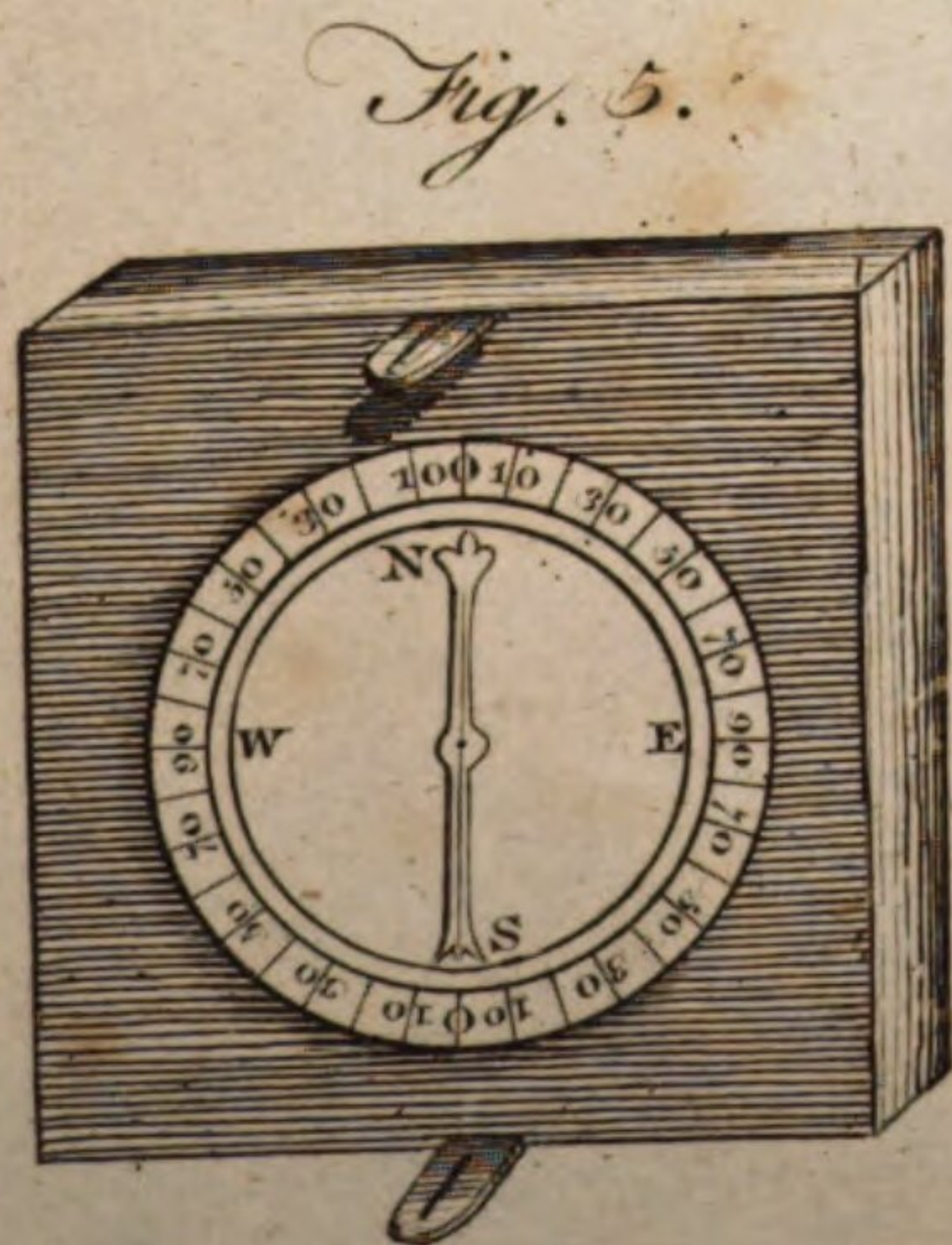
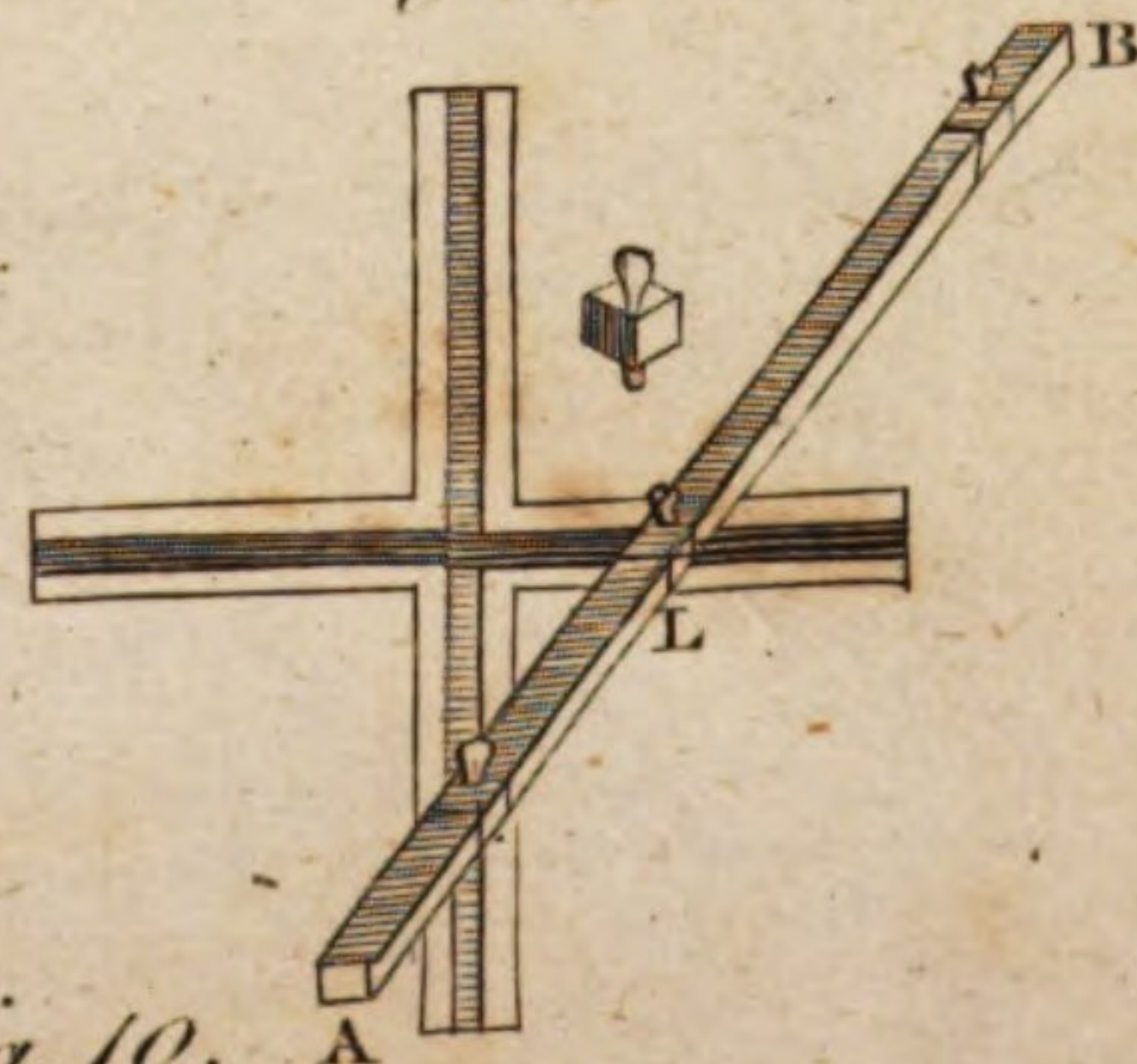


Fig. 9.



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Fig. 1.

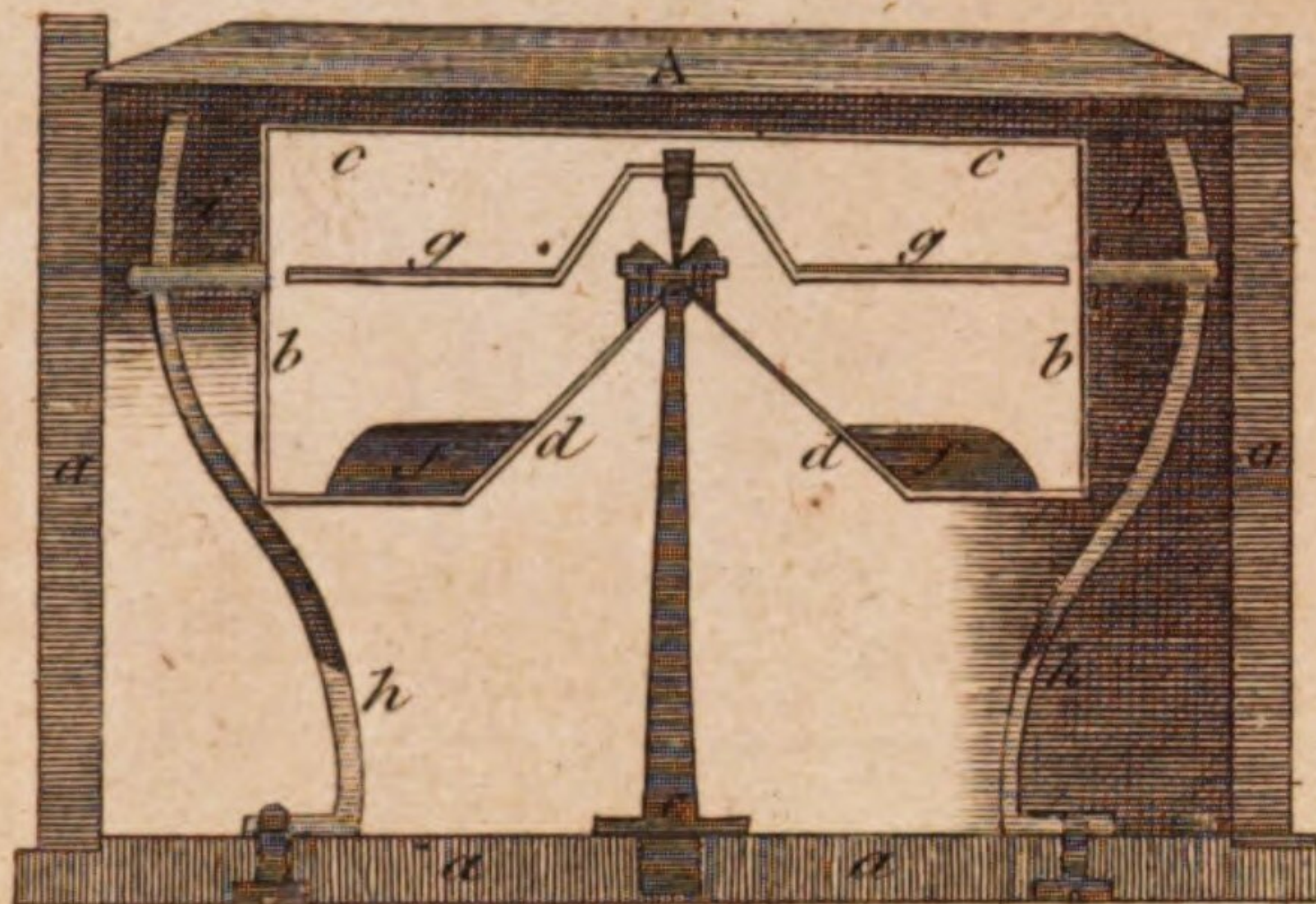


Fig. 2.

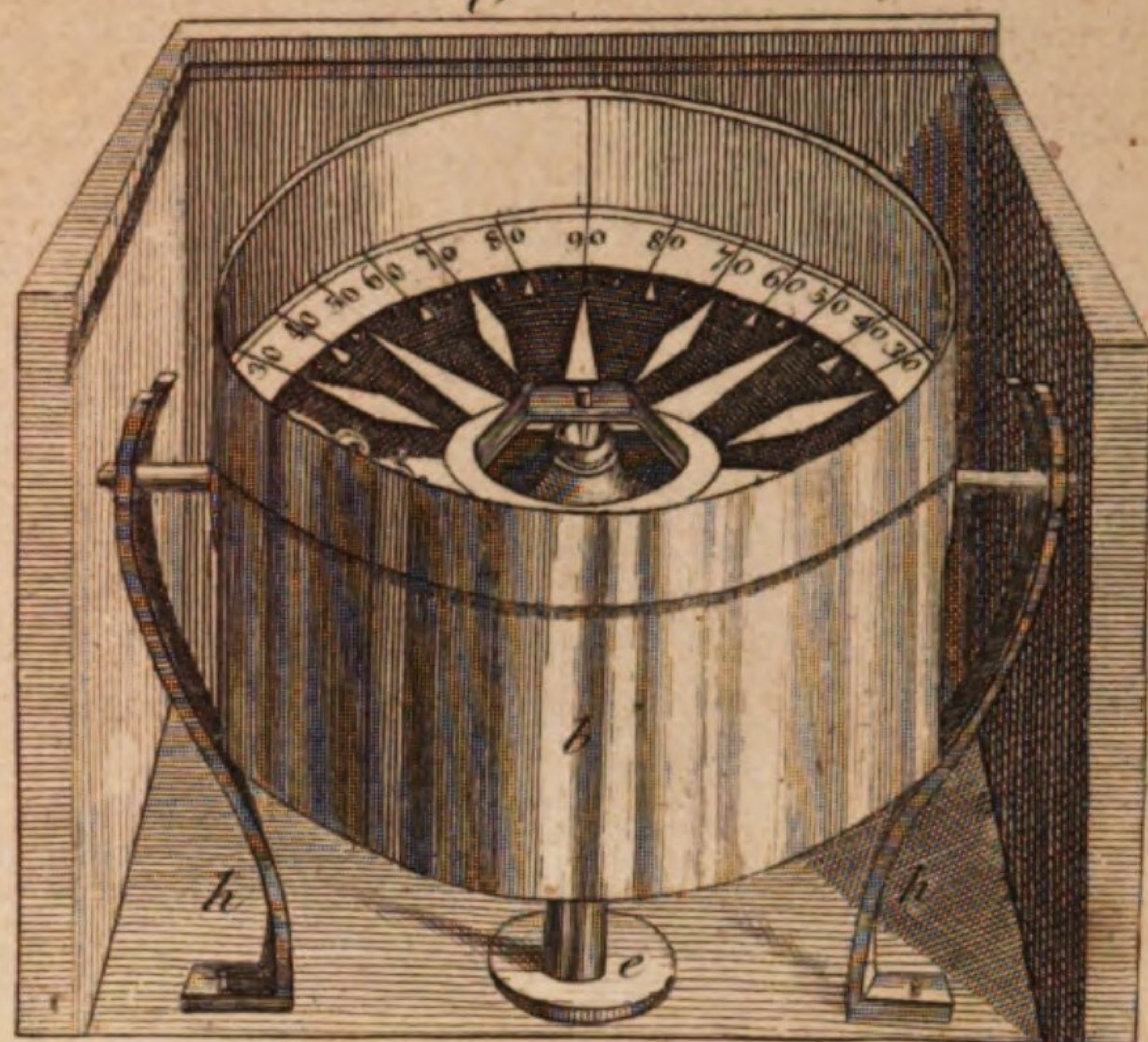


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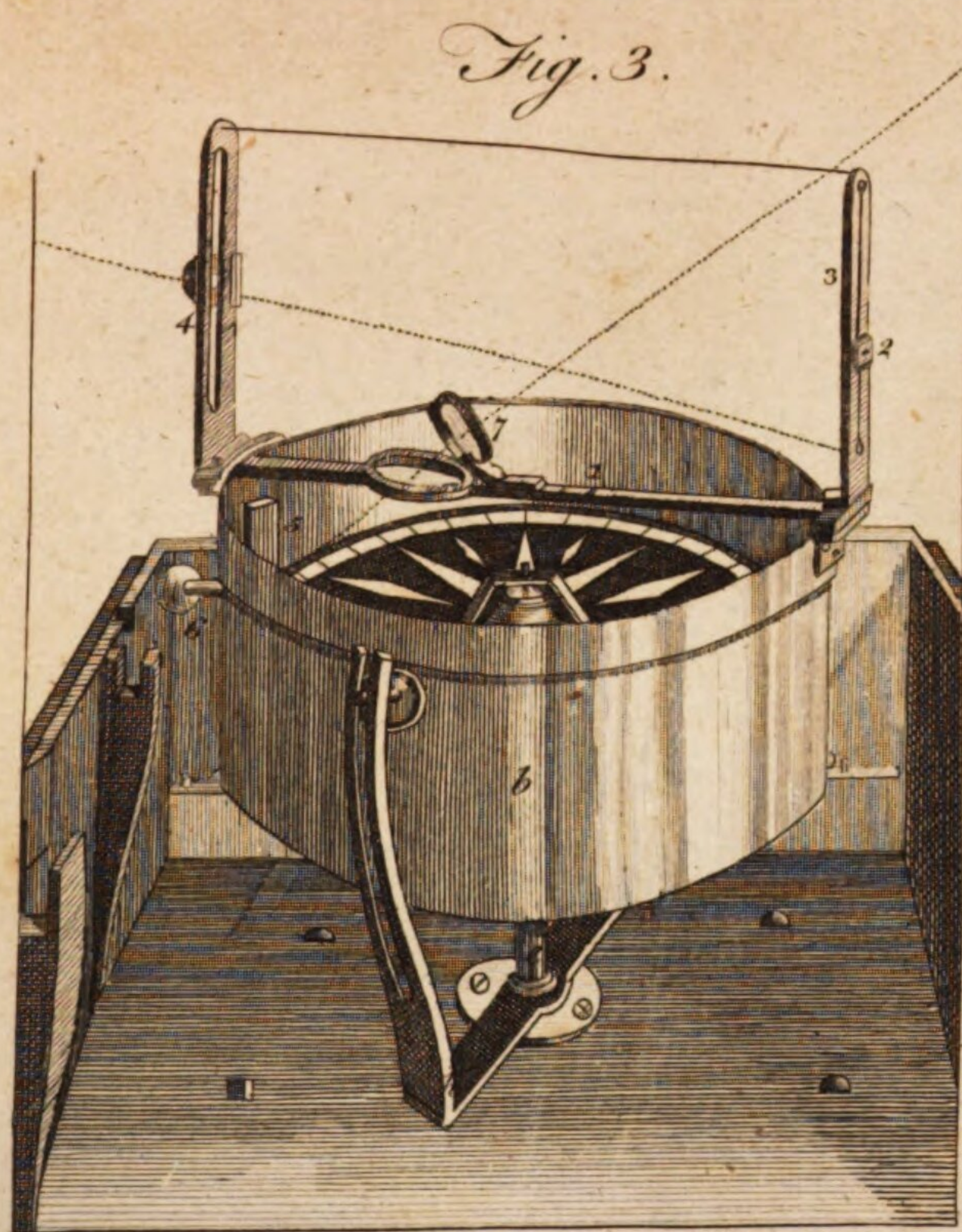


Fig. 4.

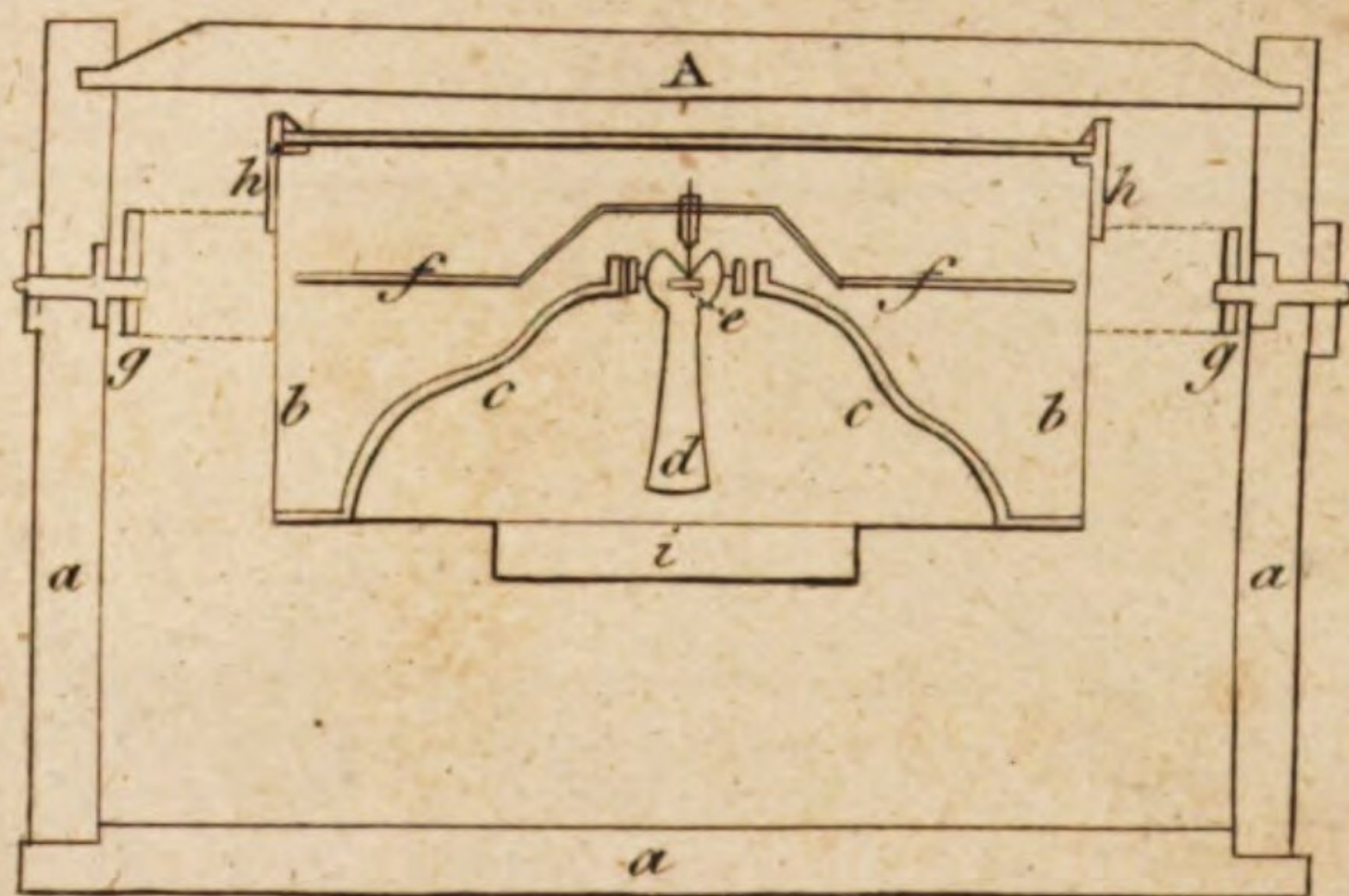


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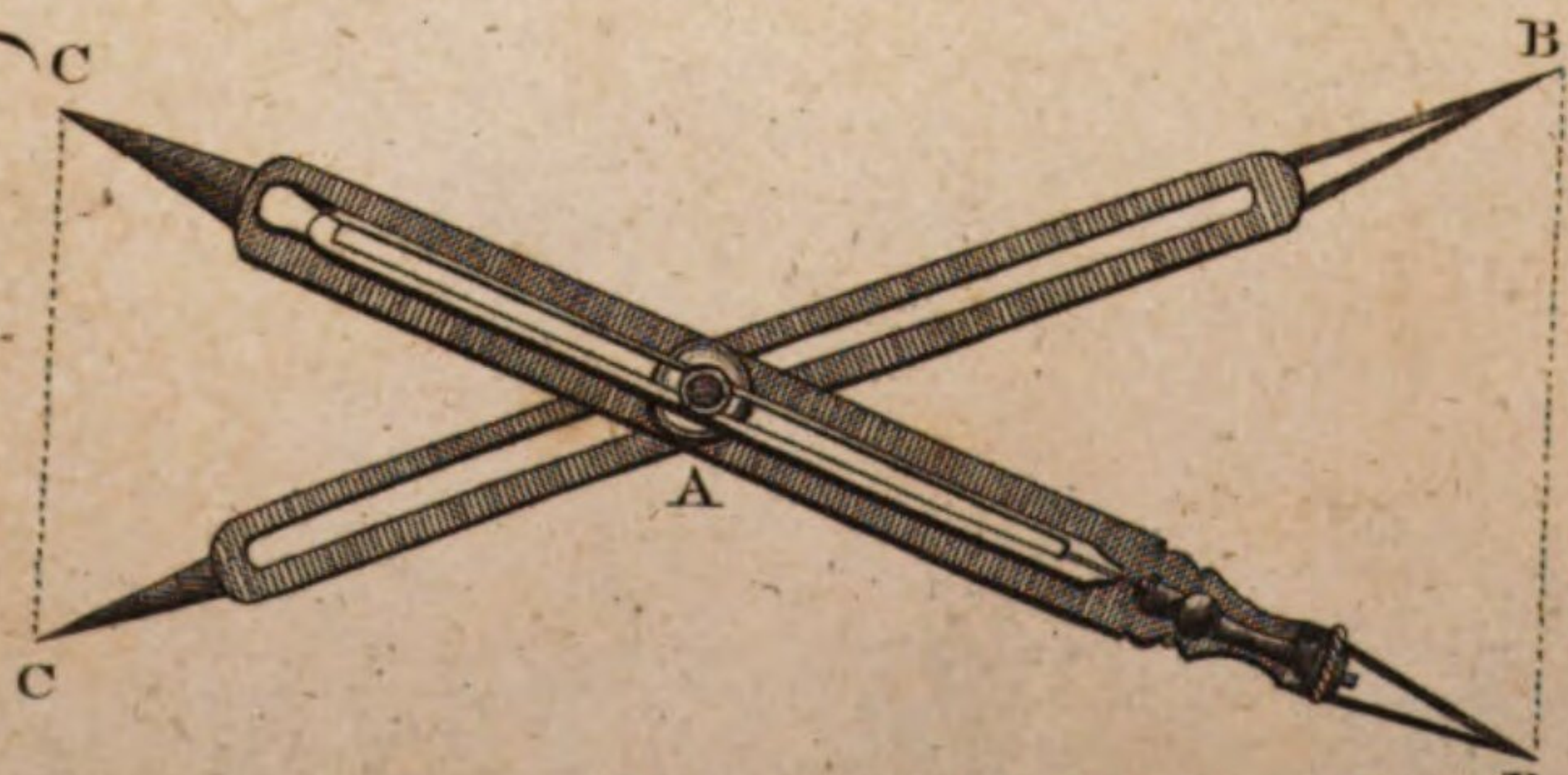
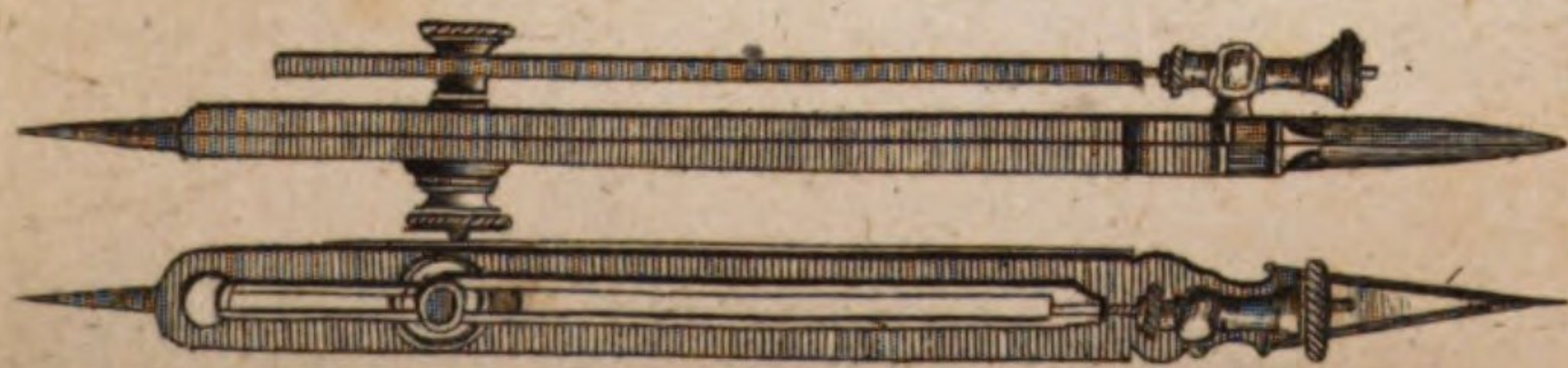


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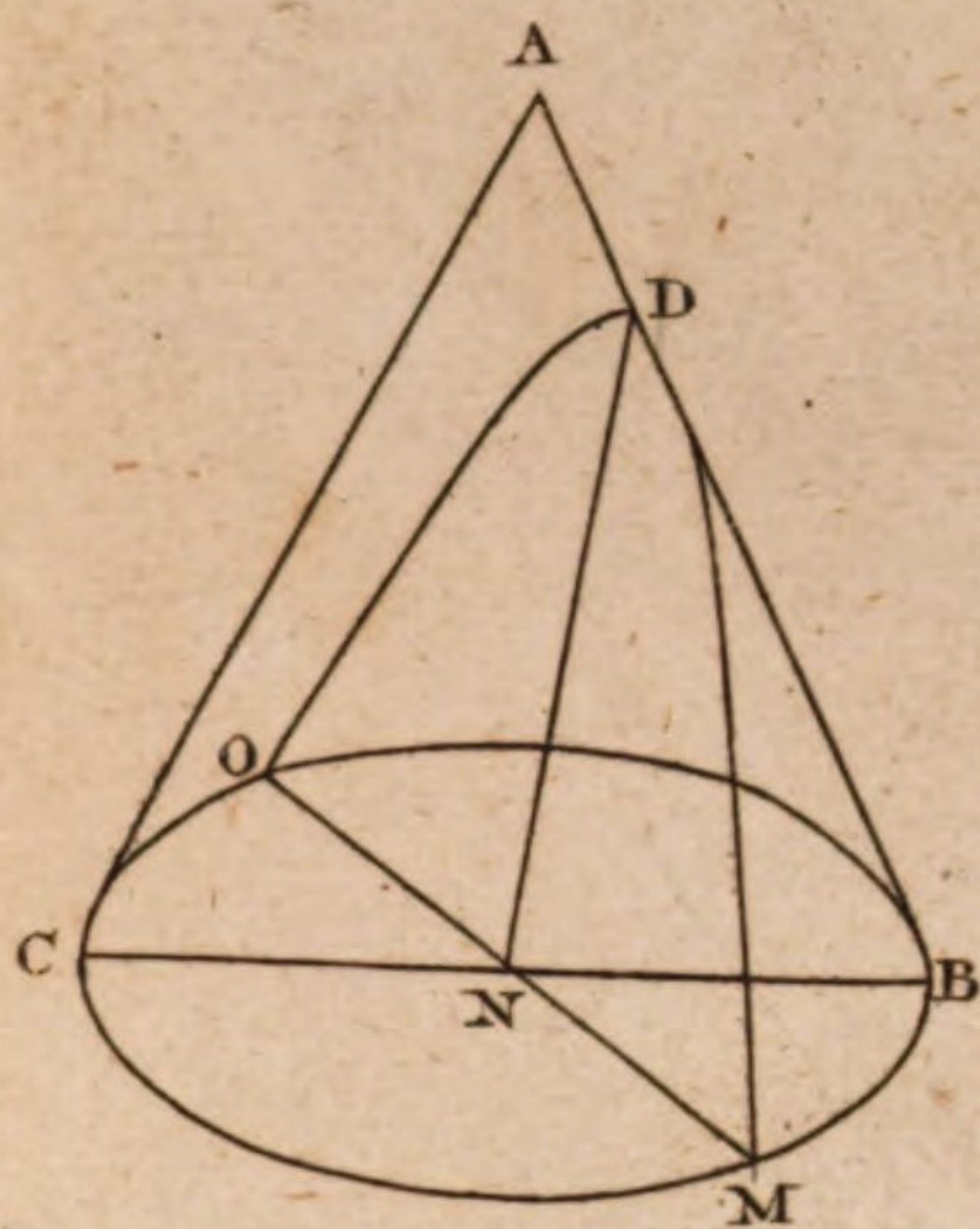


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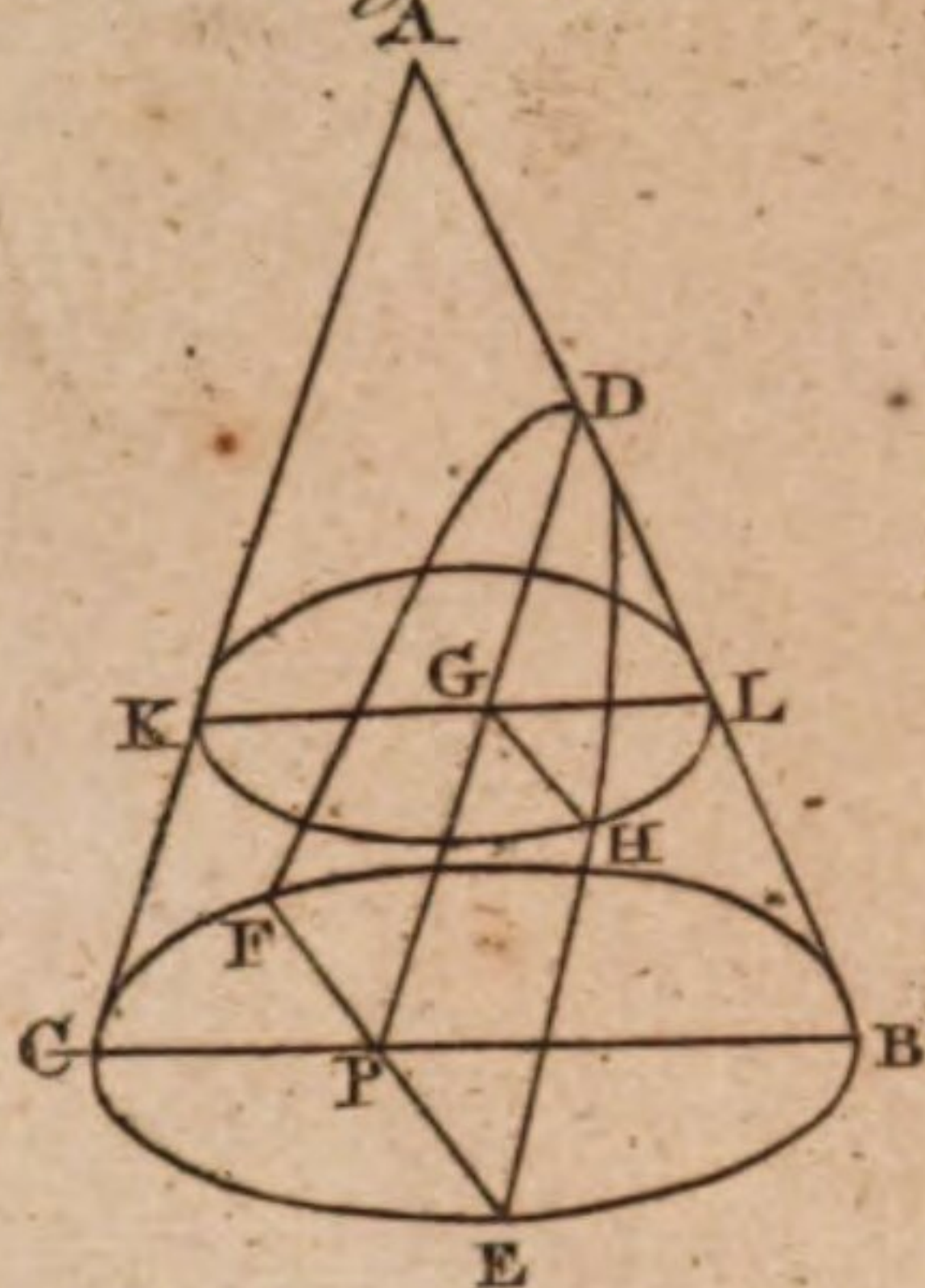


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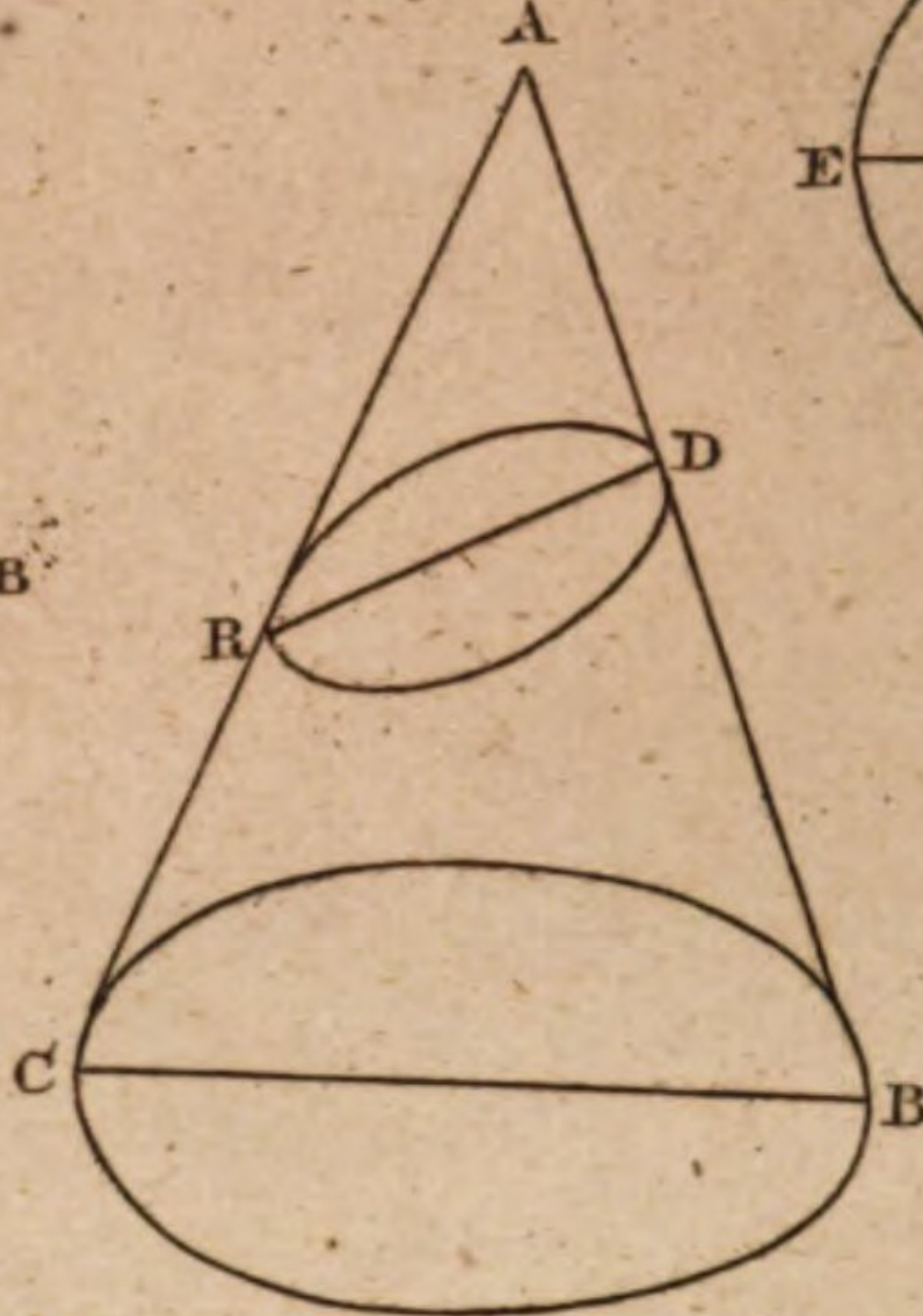


Fig. 5.



Fig. 6.

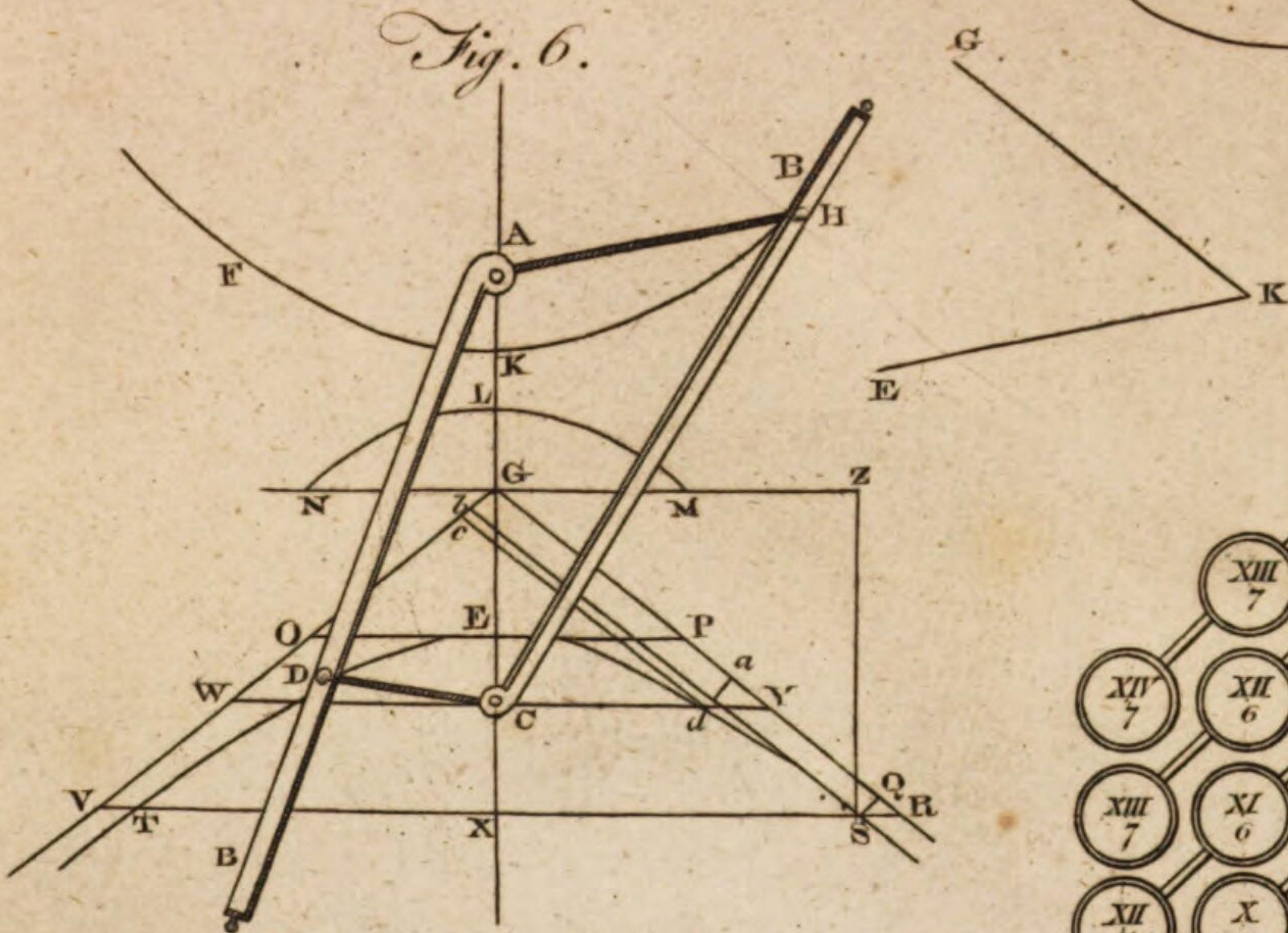
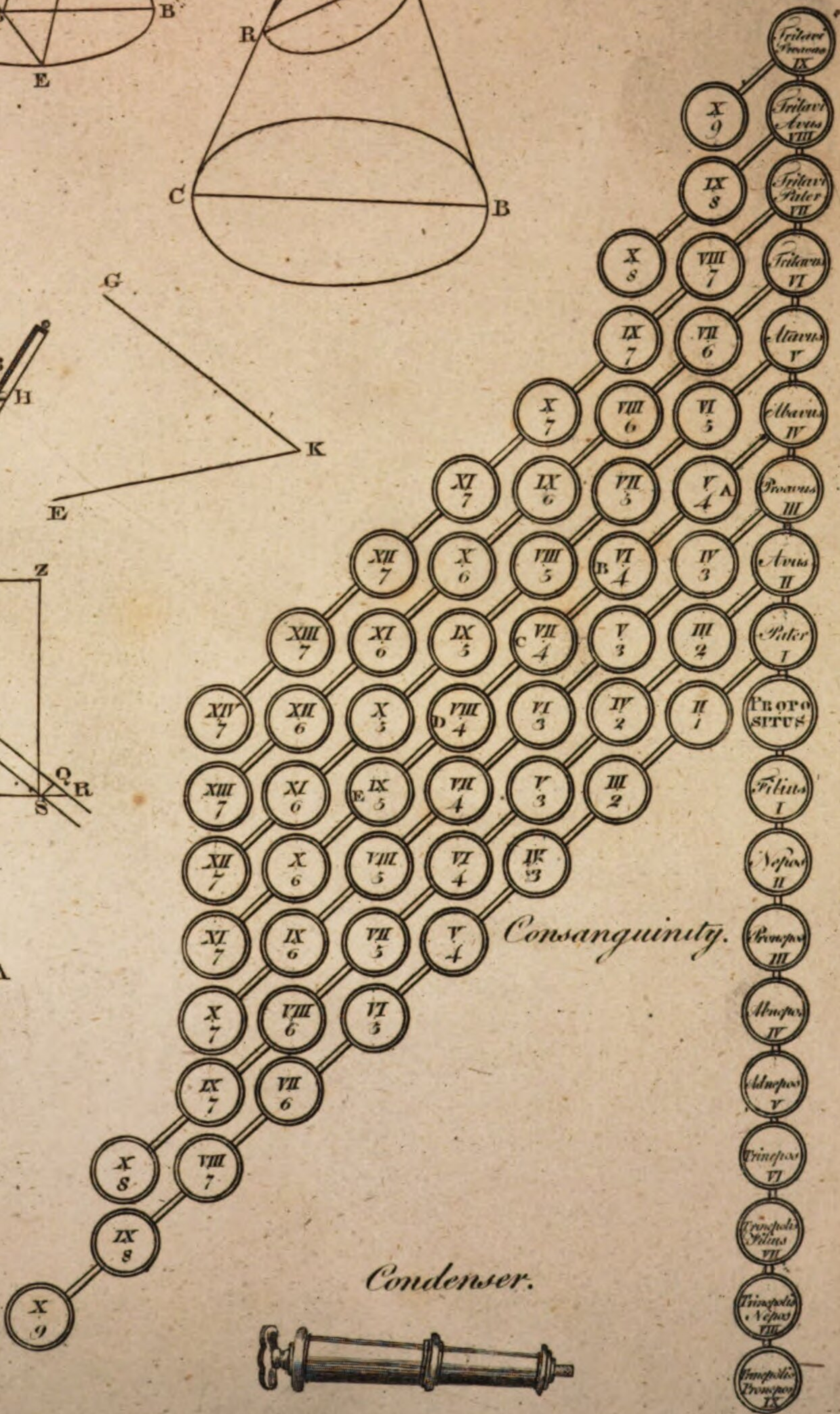
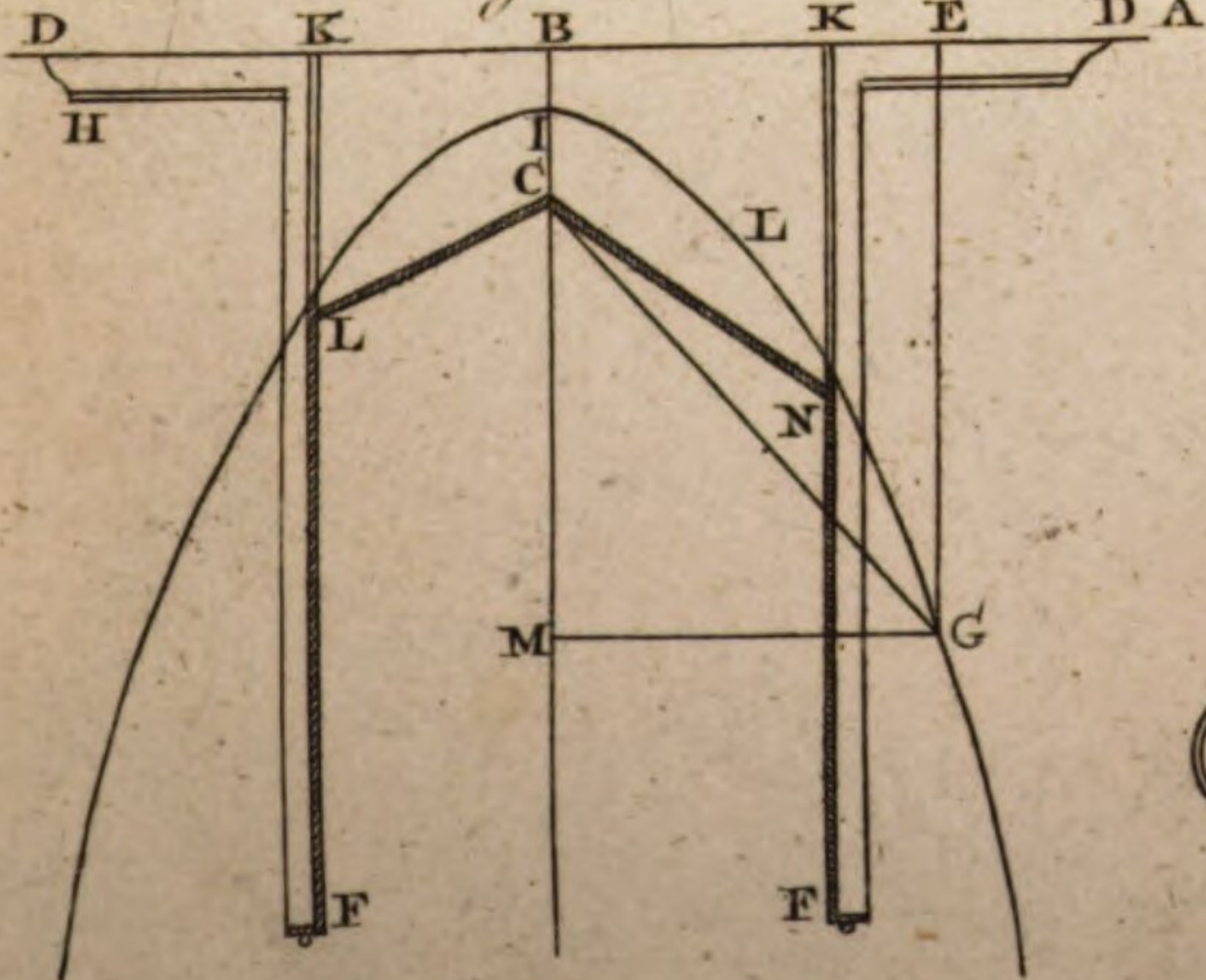


Fig. 4.



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